

PROCESSING SERVICES IN  
TELECOMMUNICATIONS MARKETS

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# PROCESSING SERVICES IN TELECOMMUNICATIONS MARKETS



## **PROCESSING SERVICES IN TELECOMMUNICATIONS MARKETS**

### **ABSTRACT**

This report, produced by INPUT's Market Analysis and Planning Service (MAPS), examines actual and potential markets for processing services for telecommunications companies.

In addition to analyzing opportunities with the divested Bell Operating Companies, this report also covers independent telephone companies, interexchange carriers (IXCs), long distance resellers, cellular telephone, cable television, and shared tenant services (STS) enterprises which assume telecommunications management functions for others.

Processing activities covered include billing services, network management and analysis, order processing, customer directory data bases, and inventory control services directed at the industry.

This report contains 121 pages, including 20 exhibits.



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**PROCESSING SERVICES IN  
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## I INTRODUCTION



## I INTRODUCTION

### A. BACKGROUND

- The breakup of AT&T has created an upheaval in the telecommunications market and new opportunities for meeting service requirements.
- The seven Regional Bell Operating Companies (RBOCs), the 24 Bell Operating Companies (BOCs), and their subsidiary corporations are providing both new and continuing services with new and continuing processing requirements.
- In addition to AT&T's offspring, there are independent telephone companies, cellular radio operators, and other telecommunications entities which are prospects for remote computer services (RCS).
- This report produced by INPUT's Market Analysis and Planning Service (MAPS) examines actual and potential needs for processing services in the telecommunications market.

## B. METHODOLOGY

- The research for this report consisted of:
  - Client interviews.
    - INPUT's telecommunications and processing services clients were sampled to determine their areas of special interest and to learn of their experiences, problems, and needs in this area.
  - Corporate interviews.
    - Structured interviews were conducted with 20 management personnel at telecommunications firms (primarily telephone companies) in November 1985. The questionnaire used is in Appendix B.
  - Vendor interviews.
    - Interviews were conducted with 17 vendor representatives from RCS, turnkey systems, and relevant software providers. The questionnaire used is in Appendix C.
  - Industry observer interviews.
    - Interviews were conducted with four representatives of telecommunications industry associations.
  - Product and service analysis.
    - INPUT collected and analyzed information on 21 processing services, turnkey systems, and software vendors, and reviewed secondary research sources.

- Other studies.
  - . Research conducted for other INPUT studies has been used, as outlined in Section D of this chapter, to further understand the issues and markets discussed.

### C. SCOPE

- In addition to analyzing opportunities with the divested Bell Operating Companies, also researched were independent telephone companies, inter-exchange carriers (IXCs), long distance resellers, cellular telephone, and shared tenant services (STS) enterprises which assume telecommunications management functions for others.
- The report excludes the radio and television segments of telecommunications but does include an analysis of the cable television industry, focusing on voice and data applications in that industry.
- Processing activities covered include billing services, network management and analysis, order processing, customer directory data bases, and inventory control services directed at the industry.
- Excluded are processing services which are not unique to the telecommunications industry, such as payroll services and Computer Output Microfilm (COM).
- The study addresses the following topics:
  - Overview of divestiture and its effects on the telecommunications industry, with an analysis of the BOCs, independent telcos, cellular radio, shared tenant services, and cable television entities (Chapter III).

- Marketing and strategic analyses, profiles of services, product development and marketing approaches of telecommunications processing services, competitive technologies such as turnkey systems, and complementary capabilities in professional services (Chapter IV).
  - Market analysis, opportunities, and recommendations to RCS vendors now participating or evaluating market entry in the telecommunications industry. The chapter also contains INPUT's industry forecasts (Chapter V).
  - Conclusions (Chapter VI).
- Definitions of terms used in this report are contained in Appendix A.

#### D. RELATED INPUT REPORTS

- Electronic Data Interchange, 1985.
  - Electronic Data Interchange (EDI) is the electronic transfer of business information between organizations in a structured application. This report describes EDI activities in several industries, profiles services and software vendors, and analyzes issues affecting acceptance of EDI. Market forecasts and recommendations to industry participants are included.
- U.S. Information Services Markets, 1984. Volume I - Industry Specific Markets, Volume II - Cross Industry Markets.
  - These reports analyze patterns and levels of spending in U.S. information services. Volume I addresses 14 industry-specific markets,

including banking and finance, manufacturing, insurance, and medical, among others, with five-year forecasts detailing expected spending levels and growth rates. Volume II analyzes services in applications such as accounting and payroll, systems software, and utility processing, and services such as value added networks and on-line data bases.

- Personal Computer Opportunities for Remote Computing Services Vendors--U.S., 1983.
  - The explosive growth of microcomputers in business presents both a threat and an opportunity to the RCS vendor. The report identifies users' needs and attitudes. Responses of the RCS vendors to the challenge are analyzed, and the impact of trends revealed are synthesized into a self-analysis methodology to help RCS vendors understand their opportunities. The report concludes with specific strategy recommendations.
- Successful RCS Strategies for the 1980s, 1984.
  - This report examines the "how" and "why" of successful RCS products. The reports provide examples, recommends strategies for changing delivery modes when necessary, and projects the future for successful RCS companies.
- Systems Versus Services for Small Organizations: New Decision Criteria, 1984.
  - This report analyzes the next area of RCS on which micros will have an enormous impact: the largely batch, cross industry services performed for small organizations. The report examines what users want, what type of service or system they will use, and how they will choose.



## **II EXECUTIVE SUMMARY**



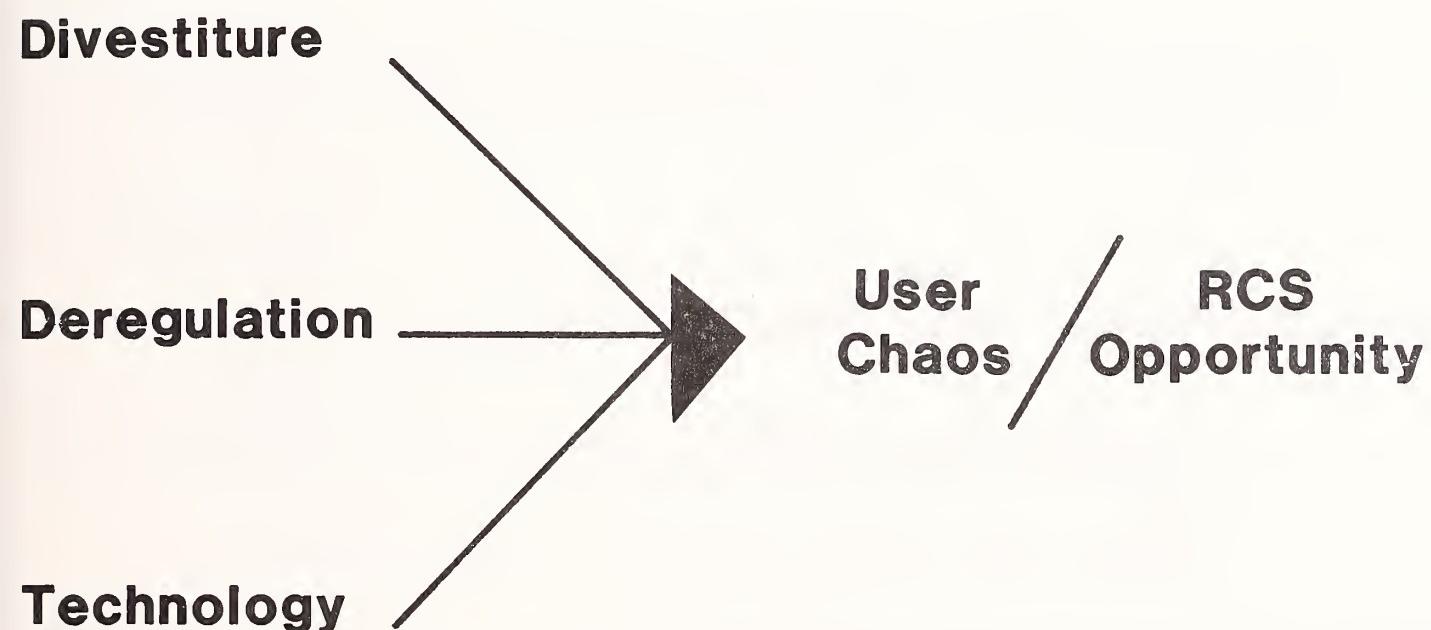
## **II EXECUTIVE SUMMARY**

- This Executive Summary is designed in presentation format to help the reader quickly review key research findings and recommendations. It will also provide an executive presentation, complete with script, to facilitate group communications.
- The key points of the entire report are summarized in Exhibits II-1 through II-4. On the left-hand page facing each exhibit is a script explaining that exhibit's contents.

## A. CHANGES IN TELECOMMUNICATIONS LEAD TO RCS OPPORTUNITY

- Divestiture, deregulation, and technological advances in telecommunications have combined to create both chaos and opportunity for remote computing service (RCS) vendors.
- These changes have led to new responsibilities and new relationships.
- The Bell Operating Companies are no longer dependent on Western Electric or other AT&T companies for products and services.
- Local telephone companies provide AT&T and other long distance inter-exchange carriers (IXCs) with billing information and services, requiring complicated data records.
- Technology advances and increasing network traffic have led telephone companies to upgrade central office equipment from analog to digital switches. On-line applications designed for telephone companies by RCS vendors are used to manage complicated conversion and installation projects.
- Deregulation has led to opportunistic enterprises in cellular telephone, long distance, reselling, and shared tenant services. These entities often approach business with financial and marketing concerns which override billing systems concerns. This, too, creates RCS vendor opportunities.

## **CHANGES IN TELECOM LEAD TO RCS OPPORTUNITY**



## B. WHO DOES WHAT IN TELECOMMUNICATIONS PROCESSING

- On-line telephone planning and management applications are available from McDonnell Douglas Information Systems Group and Comshare.
  - Some applications were adapted from general business systems, such as inventory, project, or workforce management, while others have been developed specifically for the telephone industry.
- Billing is handled internally by the Bell Operating Companies (BOCs), large independent telephone operating groups, and large interexchange carriers.
- Due to divestiture requirements, BOC subsidiaries operating cellular telephone systems contract with outside services for billing despite the relationship with a telephone company which has processing facilities.
- Approximately 58% of the 1,440 independent telephone companies are served by approximately eight small RCS firms specializing in processing for the industry.
- Because long distance resellers access various facilities, they cannot use the processing services of the companies they resell. They will either operate their own billing centers or contract for processing services.

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## **WHO DOES WHAT IN TELECOMMUNICATIONS PROCESSING**

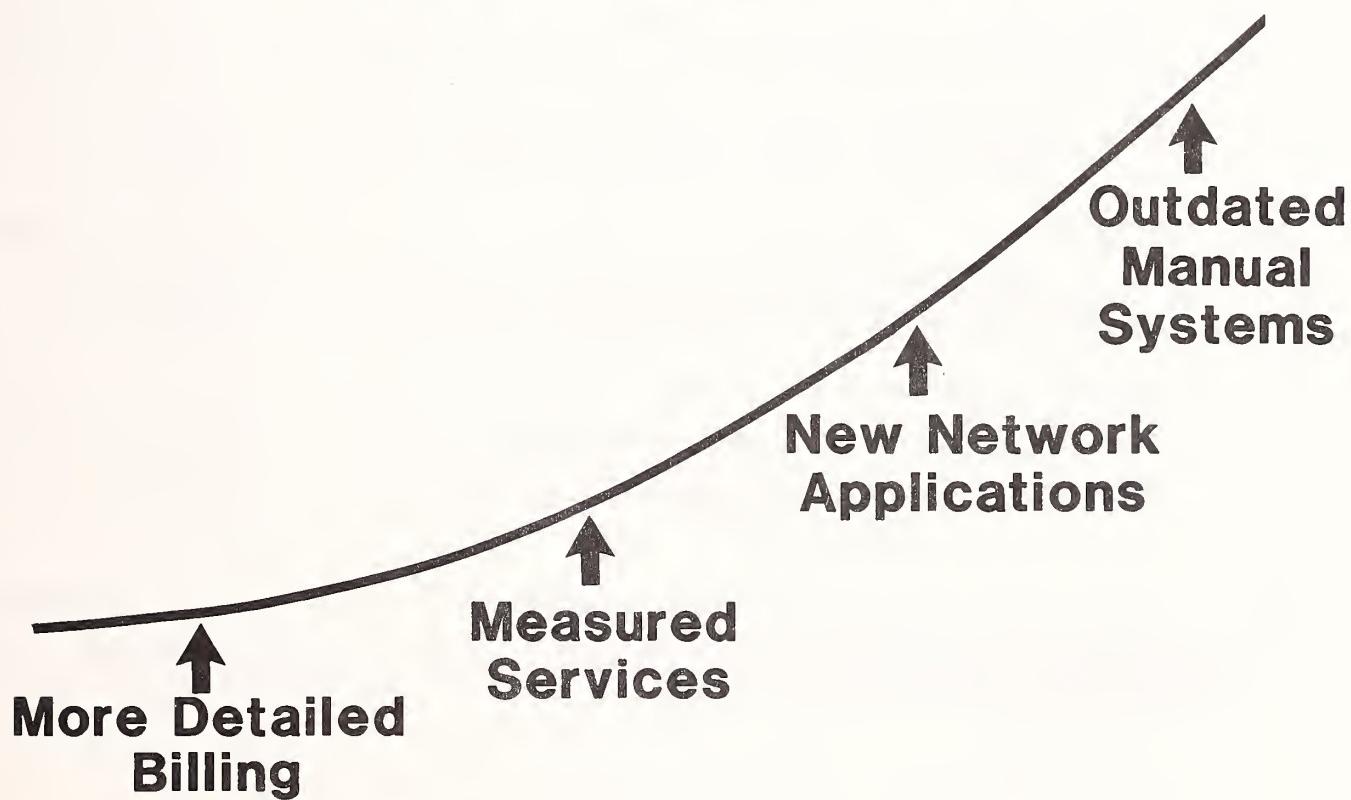
- **Telephone Management Services - - Two Vendors (McDonnell Douglas & Comshare)**
- **Billing**
  - **BOCS, Large IXCs, and Large Independents: Internal**
  - **BOC Subsidiaries: Often Use RCS**
  - **Independent Telcos: 58% Use RCS**
  - **Long Distance Resellers: Internal or External**

### C. TELEPHONE PROCESSING NEEDS ARE INCREASING

- Equal access, requiring telephone companies to provide the same quality of local connection to all long distance carriers, also means more detailed billing data.
- As telephone companies move users from flat, fixed rates to measured services, billing data records increase.
- Electronic mail, Automated Teller Machines (ATMs), Point-of-Sale (POS) terminals, credit card authorizations, and other forms of data communications add to network traffic, create more billing records, and accelerate network improvements. Separate tariffs for data communications complicate billing.
- Small independent telephone companies often handle their bill processing manually.
  - While this method served in the old days, the requirements of the new order make manual systems hopelessly outdated.
  - New telco responsibilities require sophisticated recordkeeping, income distribution formulae, and complex business relationships.
- Many small telcos are installing their own systems, and many will begin computerization and collect data on micros while using RCS processing. For some, however, the economies of scale do not justify expensive hardware and software, and they will require full RCS services.

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## TELEPHONE PROCESSING NEEDS ARE INCREASING



#### D. RISKS FOR RCS IN TELECOMMUNICATIONS PROCESSING

- RCS vendors servicing small independent telephone companies will lose processing business due to AT&T's takeover of its own billing. This business was worth an estimated \$2 billion in 1984, although most of this was directed to the BOCs and large independents which handle processing.
- RCS vendors also face competition from turnkey systems and microcomputer solutions which enable small telcos to handle much, if not all, of their own processing.
- RCS vendors can anticipate and adapt to these challenges by incorporating microcomputers into their service mix and by offering professional services.
- Emerging markets such as cellular radio and resellers present other risks to RCS vendors, who may expend considerable effort in developing systems anticipating a processing payoff only to find the customer going bankrupt.
- Due to rapid industry changes in reporting requirements and tariff schedules, RCS firms which fail to stay current risk customer dissatisfaction and a loss of business.

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## **RISKS FOR RCS IN TELECOMMUNICATIONS PROCESSING**

- **AT&T Will Take Over Own Billing**
- **Micro-Turnkey System Competition**
- **Telcom Services' Bankruptcies**
- **Rapid Changes Require Staying Current**



### **III BACKGROUND AND OVERVIEW**



### **III BACKGROUND AND OVERVIEW**

- This chapter provides an overview of changes in the telecommunications industry which are affecting opportunities for vendors providing processing services to the industry.
- The chapter also describes the types of processing currently handled internally and those offered by third-party vendors. Later chapters provide analyses of vendor strategies, risks, and opportunities.

#### **A. TELEPHONE INDUSTRY OVERVIEW**

##### **I. AT&T AND THE BOCs**

- In simplest terms, AT&T formerly owned many local telephone companies. As a result of antitrust actions, AT&T agreed to divest its wholly-owned subsidiaries, creating 22 Bell Operating Companies (BOCs) held by seven Regional Bell Telephone Companies (RBOCs). Cincinnati Bell and Southern New England Telephone are the other two "Bell" companies which were only partially held by AT&T and thus were not divested. They were and remain independent.

## 2. INDEPENDENT TELEPHONE COMPANIES

- Aside from AT&T and its offspring are independent (i.e., non-AT&T or Bell) telephone companies, many owned by large companies, but many standalone smaller systems which provide local service, sometimes to a customer base numbering in the hundreds.
- There are 1,440 independent telcos in the U.S.
  - The smaller independents often remain uncomputerized, handling their bill processing manually.
  - Changes in the industry now make this practice extremely complicated.
- Many independents are owned by telephone operating groups, the largest ones being ALLTEL, CP National, Cencom, Centel, Continental Telecom, GTE, Pacific Telecom, and United Telecommunications.
- There are also several smaller operating groups, some providing processing to other utility services such as power and water, and at least two operating subsidiaries which provide processing services.
- Exhibit III-1 shows how independent telcos are distributed by size in the 50 U.S. states.

## 3. INTEREXCHANGE CARRIERS

- Due to deregulation activities, AT&T's former monopoly on long distance calling has eroded, leading to the rise of Other Common Carriers (OCCs) such as MCI and GTE Sprint. These firms are also called Interexchange Carriers (IXCs), and this term will be used in this report.

## EXHIBIT III-1

## INDEPENDENT TELCO DISTRIBUTION BY SUBSCRIBER ACCESS LINES

| STATE       | Number of Subscriber Lines |                   |                   |                  |                 |               |           |    | Total<br>Independents/<br>State |
|-------------|----------------------------|-------------------|-------------------|------------------|-----------------|---------------|-----------|----|---------------------------------|
|             | More<br>than<br>100,000    | 50,000-<br>99,999 | 20,000-<br>49,999 | 7,500-<br>19,999 | 2,500-<br>7,499 | 750-<br>2,499 | 0-<br>749 |    |                                 |
| Alabama     |                            | 1                 |                   | 6                | 8               | 11            | 5         | 31 |                                 |
| Alaska      | 1                          |                   | 2                 | 2                | 3               | 3             | 5         | 16 |                                 |
| Arizona     |                            | 1                 | 1                 | 1                | 1               | 2             |           | 6  |                                 |
| Arkansas    |                            | 2                 |                   | 1                | 12              | 9             | 2         | 26 |                                 |
| California  | 2                          | 1                 | 2                 |                  | 9               | 3             | 7         | 24 |                                 |
| Colorado    |                            |                   |                   |                  | 4               | 8             | 14        | 26 |                                 |
| Connecticut |                            |                   |                   | 1                |                 |               |           | 1  |                                 |
| Florida     | 3                          |                   | 2                 | 3                | 2               | 1             |           | 11 |                                 |
| Georgia     |                            |                   | 2                 | 6                | 22              | 8             | 2         | 40 |                                 |
| Hawaii      | 1                          |                   |                   |                  | 2               | 4             | 6         | 1  |                                 |
| Idaho       |                            |                   |                   |                  | 2               | 4             | 6         | 12 |                                 |
| Illinois    | 3                          | 1                 | 1                 | 4                | 10              | 21            | 17        | 57 |                                 |

Continued

## EXHIBIT III-1 (Cont.)

## INDEPENDENT TELCO DISTRIBUTION BY SUBSCRIBER ACCESS LINES

| STATE         | Number of Subscriber Lines |               |               |              |             |           |       |     | Total<br>Independents / State |
|---------------|----------------------------|---------------|---------------|--------------|-------------|-----------|-------|-----|-------------------------------|
|               | More than 100,000          | 50,000-99,999 | 20,000-49,999 | 7,500-19,999 | 2,500-7,499 | 750-2,499 | 0-749 |     |                               |
| Indiana       | 2                          | 1             |               | 4            | 11          | 22        | 10    | 50  |                               |
| Iowa          | 1                          | 2             | 1             |              | 10          | 62        | 77    | 153 |                               |
| Kansas        |                            | 1             | 1             | 2            | 11          | 17        | 9     | 41  |                               |
| Kentucky      |                            | 1             |               | 5            | 8           | 1         | 2     | 17  |                               |
| Louisiana     |                            |               | 1             | 5            | 5           | 9         | 4     | 24  |                               |
| Maine         |                            |               |               |              | 7           | 6         | 4     | 17  |                               |
| Maryland      |                            |               |               |              |             | 1         |       | 1   |                               |
| Massachusetts |                            |               |               |              |             |           | 1     | 2   | 3                             |
| Michigan      | 1                          | 1             | 2             | 2            | 8           | 20        | 13    | 47  |                               |
| Minnesota     |                            | 2             | 2             | 7            | 18          | 35        | 30    | 94  |                               |
| Mississippi   |                            |               |               | 1            | 6           | 5         | 8     | 20  |                               |
| Missouri      | 2                          |               | 2             | 4            | 8           | 17        | 7     | 40  |                               |

Continued

## EXHIBIT III-1 (Cont.)

## INDEPENDENT TELCO DISTRIBUTION BY SUBSCRIBER ACCESS LINES

| STATE          | Number of Subscriber Lines |                   |                   |                  |                 |               |           | Total<br>Independents/<br>State |
|----------------|----------------------------|-------------------|-------------------|------------------|-----------------|---------------|-----------|---------------------------------|
|                | More<br>than<br>100,000    | 50,000-<br>99,999 | 20,000-<br>49,999 | 7,500-<br>19,999 | 2,500-<br>7,499 | 750-<br>2,499 | 0-<br>749 |                                 |
| Montana        |                            |                   | 1                 | 1                | 5               | 3             | 6         | 16                              |
| Nebraska       | 1                          |                   | 1                 | 1                | 9               | 25            | 14        | 51                              |
| Nevada         | 1                          |                   |                   |                  | 2               | 2             | 1         | 6                               |
| New Hampshire  |                            |                   | 1                 |                  | 5               | 1             | 5         | 12                              |
| New Jersey     |                            |                   | 2                 | 2                |                 |               |           | 4                               |
| New Mexico     |                            |                   |                   | 1                | 2               | 5             | 3         | 11                              |
| New York       | 2                          |                   | 3                 | 6                | 15              | 13            | 4         | 43                              |
| North Carolina | 4                          | 4                 |                   | 8                | 5               | 6             | 1         | 28                              |
| North Dakota   |                            |                   |                   | 5                | 6               | 5             | 5         | 21                              |
| Ohio           | 3                          | 1                 | 3                 | 2                | 5               | 15            | 14        | 43                              |
| Oklahoma       |                            |                   | 1                 | 3                | 11              | 15            | 7         | 37                              |
| Oregon         |                            | 1                 |                   | 4                | 8               | 11            | 7         | 31                              |
| Pennsylvania   | 4                          |                   | 7                 | 4                | 12              | 16            | 5         | 48                              |

Continued

## EXHIBIT III-1 (Cont.)

## INDEPENDENT TELCO DISTRIBUTION BY SUBSCRIBER ACCESS LINES

| STATE          | Number of Subscriber Lines |                   |                   |                  |                 |               |           | Total<br>Independents/<br>State |
|----------------|----------------------------|-------------------|-------------------|------------------|-----------------|---------------|-----------|---------------------------------|
|                | More<br>than<br>100,000    | 50,000-<br>99,999 | 20,000-<br>49,999 | 7,500-<br>19,999 | 2,500-<br>7,499 | 750-<br>2,499 | 0-<br>749 |                                 |
| South Carolina |                            |                   | 3                 | 7                | 10              | 4             | 2         | 26                              |
| South Dakota   |                            |                   |                   | 3                | 6               | 9             | 13        | 31                              |
| Tennessee      | 1                          | 1                 | 1                 | 7                | 9               | 4             | 1         | 24                              |
| Texas          | 2                          | 2                 | 2                 | 10               | 20              | 23            | 15        | 74                              |
| Utah           |                            |                   |                   |                  |                 | 5             | 4         | 9                               |
| Vermont        |                            |                   |                   | 1                |                 | 5             | 2         | 8                               |
| Virginia       | 2                          |                   | 1                 | 1                | 5               | 6             | 5         | 20                              |
| Washington     | 2                          | 1                 |                   | 3                | 4               | 8             | 7         | 25                              |
| West Virginia  |                            |                   |                   | 1                | 1               | 2             | 6         | 10                              |
| Wisconsin      | 1                          |                   | 2                 | 9                | 31              | 54            | 11        | 108                             |
| Wyoming        |                            |                   |                   |                  | 1               | 4             | 3         | 8                               |
| Total*         | 39                         | 24                | 49                | 132              | 339             | 510           | 359       | 1,452                           |

\*Totals to more than 1,440 independent TELCOS due to multi-state operations.

#### 4. LONG DISTANCE RESELLERS

- Also due to deregulation, resellers of long distance services have appeared, buying a mixture of long distance capacity at wholesale rates, selling services at discounted retail rates, and making a profit on the difference.
- Because they use various carrier facilities for their services, resellers cannot use the processing services of the companies being used.
  - The facilities used for a specific call are determined based on the lowest cost routing available at the time of the call.
  - The lines used do not provide Call Detail Recording (CDR) and are therefore less expensive to acquire. A reseller must install its own switch, which may be a PBX. Although PBXs are not designed for resale operations, they can provide CDR. The tapes generated are used by a data processing facility for bill generation and analysis reporting.
- Some resellers have evolved from their previous role of installing their own networks and equipment and have become IXC's in their own right.
- Examples of resellers include Budget-Tel, Teleconnect, StarNet, First Phone, TeleSphere, Telesaver, and perhaps as many as 1,000 similar small firms which resell long distance services, usually on a local or regional basis.
- Some credit card companies resell long distance services. An example is American Express' Expressphone with service provided by MCI.
- Smaller resellers are being absorbed by larger companies which are expanding their service regions while maintaining their marketing advantages through local business relationships.

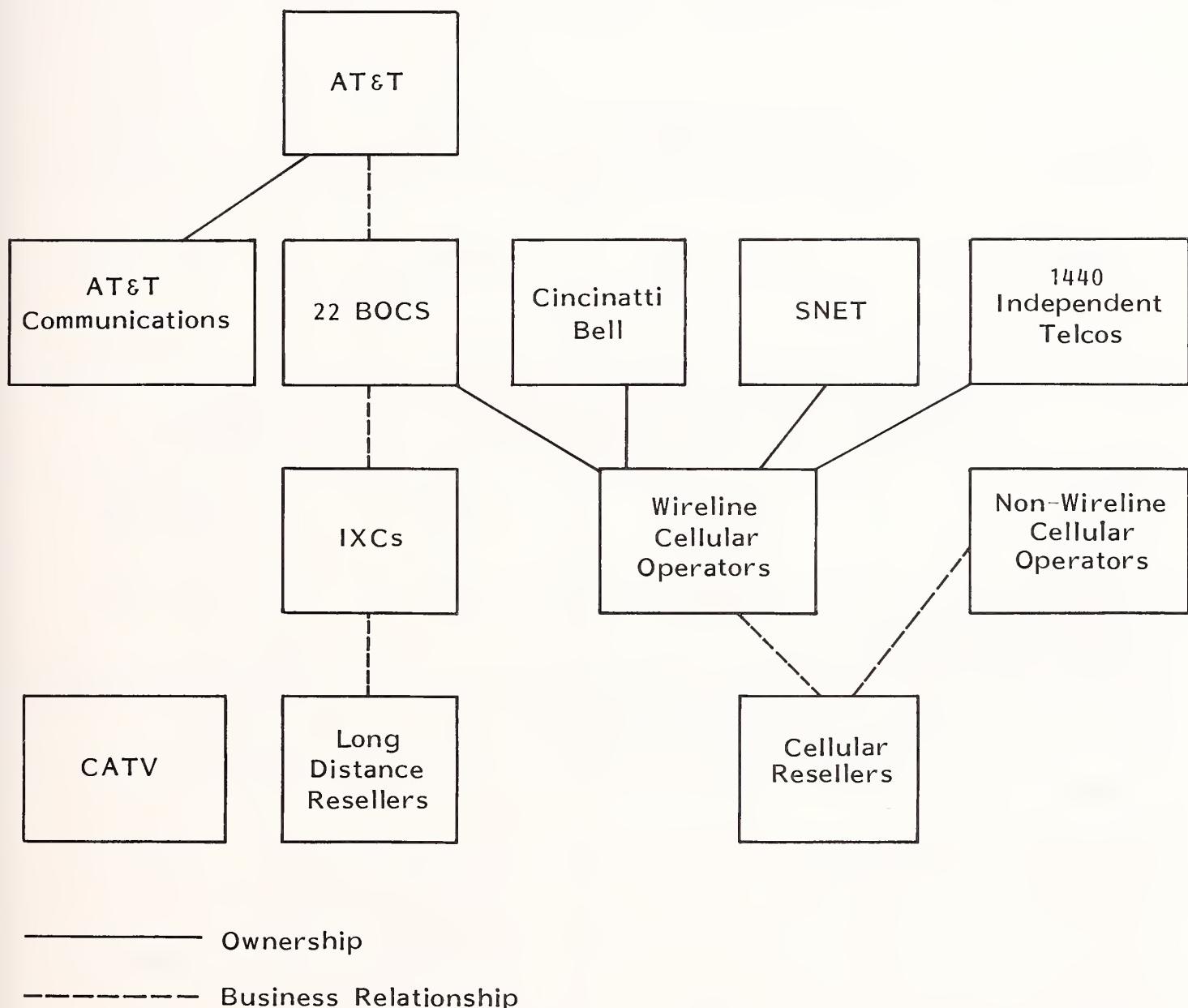
- Large companies with excess capacity on their private networks have also gone into the resale business.
  - Some allow their employees to access the network in the evening or on weekends for discount calling as a fringe benefit.
  - Employees are billed for their calls based on the access number entered into the system.
- The telecommunications industry structure is shown in Exhibit III-2.
- Exhibit III-3 provides statistical information regarding the U.S. telephone industry.

## **B. INDUSTRY CHANGES PREDATE DIVESTITURE**

- I. CUSTOMER PREMISES EQUIPMENT USERS ALSO NEED PROCESSING
  - In 1968, the FCC issued the historic Carterphone decision which allowed privately owned equipment to be used on regulated telephone company networks.
  - Sophisticated PBX systems evolved over the next few years, weaning users from central office services. Some PBXs incorporate passive recording devices which capture call usage data. However, pricing is generally not provided and the information is not organized.
    - This creates needs for systems providing formatted information for:
      - Internal department chargebacks.
      - Client billing for telephone calls.

EXHIBIT III-2

TELECOMMUNICATIONS MARKET STRUCTURE



## EXHIBIT III-3

**STATISTICAL DATA: U.S. TELEPHONE INDUSTRY**  
**(1984)**

|   | INDEPENDENTS         | BOCs*                  | TOTAL                  |
|---|----------------------|------------------------|------------------------|
| Operating Revenue (\$000)   | \$16,000,000         | \$57,867,566           | \$73,867,566           |
| Access Lines (000)  | 23,020               | 91,329                 | 114,349                |
| <b>OPERATING EXPENSES FOR COMMERCIAL CONTRACTS</b><br>(Percents Show Relationship to Total Operating Revenue) |                      |                        |                        |
| Operating Expenses (\$000)  | \$979,893<br>(6.36%) | \$4,771,999<br>(8.25%) | \$5,751,892<br>(7.85%) |
| Expenses per Access Line: Commercial Contracts  | \$45.75              | \$52.84                | \$51.48                |
| <b>CENTRAL OFFICES BY TYPE SWITCH</b>   |                      |                        |                        |
| Step by Step  | 5,602                | 3,721                  | 9,323                  |
| Crossbar  | 806                  | 2,271                  | 3,077                  |
| Analog  | 610                  | 4,156                  | 4,766                  |
| Digital   | 2,071                | 493                    | 2,564                  |
| Other   | 499                  | 452                    | 951                    |
| Total Central Offices   | 9,588                | 11,093                 | 20,681                 |

\* Includes Cincinnati Bell and Southern New England Telephone

Source: U.S. Telephone Association, 7/85

- Shared tenant service billing.
  - Hotel, motel, hospital, and campus billing of guests, patients, and students.
- There are approximately 40 service bureaus which provide this type of processing. Turnkey systems for internal use can also be purchased.
  - Although the methods and technology are similar to services used by telecommunications companies, such processing, with the exception of emerging shared tenant services, is not central to this study.
2. SINCE DIVESTITURE TELCOS CAN SHOP ANYWHERE
- The Modification of Final Judgement (MFJ) issued by United States District Judge Harold H. Green described the conditions of divestiture. It carried specific language about providing services to the BOCs and interexchange carriers.
  - The MFJ read "No BOC shall discriminate between AT&T and its affiliates and their products and services and other persons and their products and services in . . . procurement . . . (or) the provision of new services and the planning for and implementation of construction or modification of facilities used to provide exchange access and information access."

- Information access is defined as providing specialized exchange services in connection with telecommunications traffic to or from an information service provider's facilities.
- This includes automatic calling number identification and customer billing information, plus other information.

- The MFJ does not require a BOC to bill customers for interexchange (long distance) services, but if it does, billing costs need to be included in the tariffed access charges.
- With the divestiture of the 22 BOCs from AT&T, previous restrictions on goods and service purchasing from suppliers other than AT&T and its subsidiary Western Electric fell away. The BOCs are now independent entities and can buy from whomever they wish.
- Of course, the 1,440 independent telephone companies had no restrictions--they could always purchase from any vendor.

### 3. DIVESTITURE HAS CREATED COMPLICATIONS

- Divestiture has significantly impacted the BOCs and independent telcos in software maintenance and especially in carrier access billing and toll processing, leading in some cases to upgraded company processors and staff, and in others to increased volume (and opportunities) for RCS provided services.
- Divestiture has required RCS' doing business with independent telcos to manage these changes, often on tight time-lines.

## C. NEEDS FOR SOME PROCESSING SERVICES WILL INCREASE

- The changes in telecommunications caused by both divestiture and technology advances present opportunities to processing service providers.
- I. BILLING
- The volume of billing data is expected to increase, perhaps as much as 1000% by 1988, with most of it occurring in the 1986-1987 timeframe.

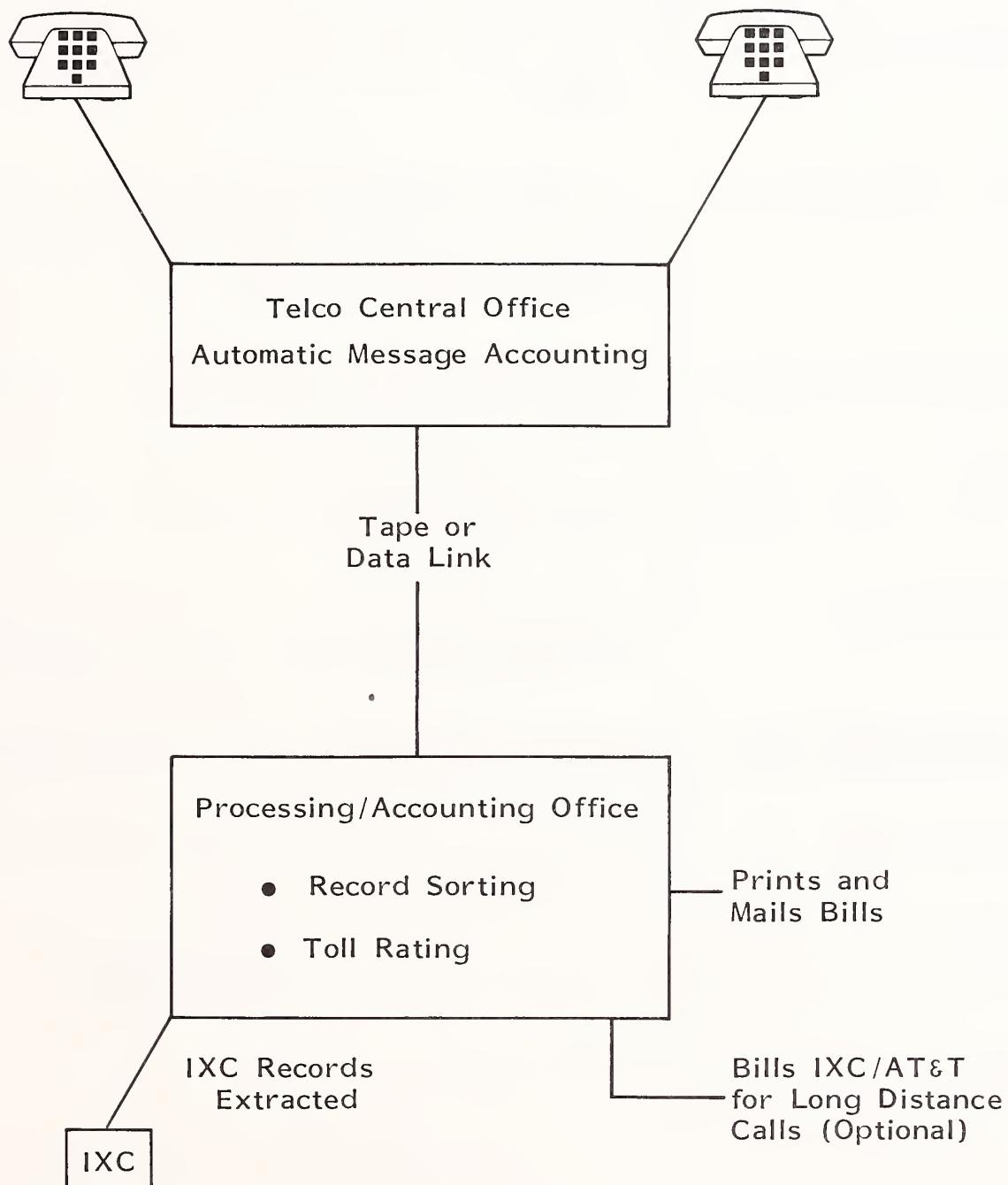
- The reasons for this are:

- The MFJ divestiture rulings require the BOCs, if switching equipment permits, to provide "equal access" to interexchange carriers. Equal access will require more information in billing records for accounting purposes.
  - . Equal access means that the same line quality must be offered to the interexchange carriers that is offered to AT&T for long distance connections at the same price.
  - . It further eliminates the consumer's need to dial special phone numbers to access the interexchange carriers or to use Dual Tone Multi-Frequency (DTMF) touchtone telephones to control calling. This will lead to increased IXC usage and billing data.
  - . Records will be needed on all calls terminated at local exchanges regardless of completion because the IXCs will pay access fees to local facilities even when calls are incomPLETED.
- The National Exchange Carrier Association (NECA) was established under FCC orders shortly after divestiture to consolidate tariff filings for all telcos, BOC and independents alike.
  - . More relevant to this study, NECA collects interstate access charge tariff revenues as ordered by the FCC and distributes funds on a formula relating to the costs of doing business and other factors.
  - . This requires monthly reports from the telcos on the revenues billed to interexchange carriers and the costs associated with providing common line services.

- The Carrier Common Line element of the tariff refers to subscriber lines used for both local and long distance service.
    - The Traffic Sensitive element defines rates charged interexchange carriers for equipment installed on the basis of call volume.
    - The Billing and Collection element sets rates charged carriers for billing long distance customers.
  - Other reasons for the expected increase in billing data volume are:
    - Many local telephone companies are moving subscribers away from "flat rate" service to measured service which is often more economical for the customer, but requires more recordkeeping.
    - Technology and market demands are leading to added custom features, including future services. Examples are conference calling, call forwarding, electronic banking, phone shopping, electronic mail, videotex, and increasing data traffic from POS terminals and credit card authorization systems.
  - Exhibit III-4 is a simplified schematic showing the steps involved in generating a telephone bill.
  - Exhibit III-5 lists some of the elements typically found in a telephone bill.
2. NETWORK DESIGN AND MANAGEMENT SERVICES
- Previous reliance on AT&T for services in network design and management has created opportunities leading to new services.

EXHIBIT III-4

STEPS IN TELEPHONE BILLING



- Bills Customer Directly

or

- Compares Records to Telco Bill

EXHIBIT III-5

ELEMENTS OF A TYPICAL BOC TELEPHONE BILL

|                       |   |
|-----------------------|---|
| Local Services        | Voice, data special features. Discount schedules may apply.   |
| AT&T Communications   | Customer premises equipment (billed separately by AT&T), long distance (will be billed separately), foreign exchange, 800/WATS, Directory Assistance. Discount schedules apply. |
| Interexchange Carrier | For example: MCI, Sprint. Discount schedules may apply.   |
| Network Access Charge | For interstate calling, imposed by the FCC (\$1 per line).  |
| Rate Surcharge        | Imposed by state Public Utilities Commission (PUC) for interim rate changes prior to tariff approvals.  |
| State Regulatory Fee  | Applied to intrastate calling, for state PUC funding.   |
| State Law Fees        | For example, funds to provide communications devices for the deaf.  |
| 911                   | To support emergency 911 services.  |
| Taxes                 | Federal/State   |

- Independent telcos have always needed these services, but they are becoming more important due to the complexity of upgrading central office switching equipment from analog to digital technologies.
- Examples of such services include on-line systems to track equipment inventory, network efficiency, project management, repair processing, personnel scheduling, traffic volume analysis, equipment loading, and directory assistance data base management.

### 3. YELLOW PAGES/DIRECTORIES

- Under divestiture, the lucrative Yellow Pages directory business was given to the local BOCs.
- While several BOCs have their own publishing subsidiaries, telephone companies often contract with independent firms to handle data processing, data base management, sales, and directory publication.
- In many communities, both subscriber and yellow pages are published together.
- Industry leaders include Donnelley Information Service (Purchase, NY, a division of Dun and Bradstreet), L.M. Berry (Dayton, OH), GTE Directories, Inc. (Des Plaines, IL), and Nynex Information Resources (Lynn, MA).
- There are approximately 15 others serving smaller telephone companies, some involved just in publishing, others also involved in advertising sales, compilation, and other services.

- Specialty directories are emerging:
  - The Silver Pages is targeted to senior citizens with discount coupons for services.
  - Foreign language directories are targeted to Spanish-speaking and Asian communities.
  - The Better Business Bureau publishes regional directories in many locales.
  - Alternative yellow page directories are also being published, and there are directories issued by industry associations.
- Directory services provided to telephone companies should link to "move and changes" processing and directory assistance systems.
- The Electronic Yellow Pages is an on-line data base which permits searching for services, generating special reports, and compiling mailing lists.
- There are no plans to include cellular telephone numbers in directories. Many operators fear this information would be used by telemarketers to call cellular users. Since users are charged for air time regardless of whether or not they initiate the call, such applications would be partially charged to the user.
- Turnkey directory assistance systems for telcos are sold by Computer Consoles (Rochester, NY), with an estimated 70% of the market. IBM's directory assistance system holds a major share of the market remainder. Comshare, Inc. markets the RetriVue System.

## D. RELATIONSHIPS ARE CHANGING

### I. AT&T AND THE BOCs

- Under terms of divestiture, the Bell Operating Companies (BOCs) were permitted to provide AT&T with order processing and billing services for up to four years or until an internal system could be developed by AT&T.
- One year after divestiture, AT&T initiated moves to end its reliance on its offspring and the independent local operating companies. AT&T now plans to start handling its own long distance billing in June 1986. This follows the takeover of WATS, 800 service, and private line usage billing.
  - AT&T estimated it paid the local telephone companies \$2 billion for these services in 1984, with rates established under access tariffs.
  - AT&T is negotiating for the BOCs to continue processing monthly subscriber long distance bills under \$5.
  - In August 1985, AT&T Communications announced it will set up five customer credit centers as part of this plan in Charleston (W.VA) Providence (RI), Atlanta (GA), and in undisclosed locations in the Midwest and the West.
  - New credit centers will extend credit and collect overdue bills from residential and small business accounts in addition to handling the billing already done by AT&T Communications for wide-area telephone service, private-line services, and toll-free numbers. A Pittsburgh national billing center was opened in early 1985 to handle WATS and 800 service billing.

- Customer remittances will be handled under a collection agreement with a bank through regional "lockbox" locations which are on-line to AT&T's Data Center in Silver Spring (MD).
  - Customer Account Inquiry Centers are being established around the country. The customer data base is said to be the largest of its kind in the world.
- AT&T hopes to take over message recording responsibilities involving the details of call duration, origination/destination points, and rate information.
  - However, in some areas this will not be immediately possible due to equipment incompatibilities.
  - AT&T will continue to buy account information from the operating companies in order to complete billing in these cases and will also continue to buy account update information about customer changes and moves.
- RCS' providing billing services to independent telcos will undoubtedly lose revenue as AT&T takes over its own billing.

## 2. AT&T AND GTE

- In 1985, AT&T contracted with GTE's Telephone Operating Group for customer billing and collection services.
  - Long distance customers within GTE's nationwide servicing areas will be billed by GTE on behalf of AT&T.
  - The three-year agreement is reportedly valued at over \$100 million annually.

### 3. BOC/INDEPENDENT TELCOS AND INTEREXCHANGE CARRIERS

- In addition to providing "equal access" as discussed above, the BOCs are required to provide billing information to the long distance interexchange carriers.
- Typically, Automatic Message Accounting (AMA) tapes are generated by central office switches. The IXC records are extracted and the tapes are provided to the IXC, which may do its own billing or use the tapes to verify billing by the BOC/Independent telco.
- In remote areas, IXC services are not yet available, but as service expands, the processing task of providing this information to IXCs increases.

## E. OTHER SERVICES

- There are other telecom entities in addition to the traditional telecommunications companies. While this report primarily focuses on telephony, some are worth evaluating for processing opportunities.

### I. CELLULAR TELEPHONE

- Cellular telephone is an improvement on mobile telephone service, offering higher capacity and allowing more simultaneous users through frequency sharing techniques.
  - a. Industry Overview
- After nearly two decades of development, cellular telephone is authorized and becoming operational in approximately 90 of the largest U.S. cities.

- Aside from automobiles, cellular telephones are being installed in commuter buses, ferries, taxi cabs, and rental cars. Cellular-related services are available on some airplaines (AirPhone) and railroads (RailPhone).
- In each market, cellular services will be provided by two companies: Wireline (a local telephone company subsidiary) and non-wireline carriers.
  - Cellular telephone company services will not generally use the processing services of the parent firm.
    - . Under divestiture, cellular subsidiaries must be separate operations.
    - . Billing services supported by regulated services and the requirements of unregulated subsidiaries are not necessarily compatible.
    - . As described below, the industry has rapid pricing changes which cannot be implemented by regulated telephone companies on a timely basis.
  - In addition to wireline cellular companies, opportunities for RCS vendors exist with non-wireline carriers and resellers.
- The built-in competition between two authorized cellular companies in each market creates challenges for cellular billing and processing services.

b. Volatile Pricing

- Regular telephone rates are based on the distance between stationary points. In cellular, at least one point is moving. Establishing the basis for billing services can be complicated.

- In addition to basic monthly fees, toll charges, equipment rental, and custom calling features, cellular users are uniquely charged for "air time."
  - There may be time-of-day price differences and volume or promotional discounts.
- As competition increases between wireline and non-wireline carriers, service charges may be changed, virtually on a moment's notice, by competitive marketing departments. Those making the changes will often fail to consider any problems caused to information systems/data processing.
- Taxi and car rental cellular service requires realtime processing. Customer bills need to reflect this on their statement or the taxi meter.
  - For this reason, car rental agencies need direct access to processing facilities used by cellular operators for billing information.
  - Taxi companies often limit calling to local numbers, charging a fixed, easily computed, time-based price such as \$1 per minute, or require patrons to charge their calls directly to credit cards. To do otherwise could be very complicated.
- Resellers most often use a billing service, but because they are separate from the service they resell, they usually use a different processing vendor than the operator. This creates data transfer and data format conversion problems since cellular billing standards have not been established.
- There are also other problems such as inconsistencies between the regular, wireline telephone system and cellular billing, and roaming.

c. Roaming

- A roamer is a mobile station communicating with a land station other than the one with which it is normally associated. Outside the home system, a cellular mobile station is not registered. Arrangements must be made for service.
- To be fully effective, cellular roaming may require a processing clearing-house. This would validate a roamer's credit rating, centralize billing or provide credit card processing, arrange for interlicensee toll settlements to divide payments among service providers, and handle billing errors.
- While such clearinghouses are being planned, it appears service operators are making their own individual arrangements or relying on credit card billing for roaming services on an unregistered basis.
  - In the Northeast corridor, continuous service is covered through system operator agreements. The home service handles billing.
  - Several companies are using a common record format for roaming traffic, but such standards remain to be adopted industry-wide.
- In addition to billing services, cellular telephone operators need other services which can be integrated with billing on a value added basis. Examples are traffic pattern analysis, channel usage, and equipment efficiency reports.
- Among companies providing cellular telephone billing services are Auxco (Maitland, FL), Cellular Business Systems (Park Ridge, IL), The Bank of Illinois (Champaign, IL), and Cincinnati Bell Information Systems, Inc. (CBIS).
- Companies selling software or turnkey systems for cellular billing include Auxton Computer Enterprises (Maitland, FL), Celltech, Inc. (Houston, TX), CBIS, and Communications Software (Atlanta, GA).

- Some of the issues in the cellular telephone industry are shown in Exhibit III-6.
- Several of these companies are profiled in the next chapter, and the cellular processing market is analyzed in Chapter V.

## 2. CABLE TELEVISION

### a. Industry Overview

- Cable television (CATV) is primarily considered a consumer information and entertainment vehicle, but there are examples of the CATV coaxial plant being used for services other than video. INPUT examined the mainstream CATV business as well as the potential applications to determine needs for processing services.

### b. Voice/Data Competition with BOCs

- CATV facilities can be used for voice and data services. Since 1983, MCI Communications has run an experimental program called Cablephone.

- MCI leases space on the cable network and handles calls through its own switching and transmission systems connected to its long distance network.
- While originally planned for service in approximately 25 markets, it is only available in eight, including New York, Dallas, and Washington, D.C.
- Cablephone is targeted to businesses with 24 or more circuits. Company officials say it is not economically feasible to provide residential service.

## EXHIBIT III-6

### CELLULAR TELEPHONE INDUSTRY ISSUES

- Wireline versus Non-Wireline Competition
- Unregulated BOC Subsidiaries
- Innovative Applications: AirPhone, Car Rental, Mobile Data
- Volatile Pricing
- Risky Reseller Business
- Roaming

- Due to recent deregulation, major CATV operators are evaluating new service options for their cable installations. Some are already offering institutional data services, typically for banks.
  - Cox Cable and Warner-Amex are offering fiber optic loops for institutional data services.
  - Questions remain about a state's authority to regulate such initiatives.
- Despite these activities, most CATV companies have little experience with complicated telecommunications and computer equipment.
  - The CATV operators' mindset is oriented to entertainment, not data or voice communications.
  - Recent deregulation has eliminated CATV "must carry" provisions requiring coverage of all local signals. This will reduce the need to upgrade facilities to accommodate more local channels and remove the impetus to apply surplus bandwidth to unproven ancillary businesses, such as bypassing local telco facilities.
  - CATV operators also face investment challenges in wiring newly won franchises and upgrading older systems. Wiring industrial/business areas can be expensive and may not result in ongoing revenues from nonresidential tenants. Data services may not be needed.
- Cablephone and other examples notwithstanding, INPUT believes that CATV voice and data services are largely technological demonstrations. These services may be alternatives to local telco bypass, but business factors may keep such initiatives from becoming significant market factors.

c. Future Services

- Past demonstrations of enhanced "home of the future" services, such as interactive programming, electronic shopping, and data base access, have been deemphasized by the CATV industry. The highly publicized Columbus (OH) CUBE service operates at a much reduced activity level.
- Pay-per-view services are also becoming less important due to inexpensive video cassette records (VCRs) and the rise of neighborhood movie rental outlets. Some still see opportunities for pay events unique to CATV.

d. CATV Billing

- Many CATV systems handle their own bill processing, sometimes selling services to others.
- The elements of a CATV bill are: monthly service (usually includes a program guide subscription), premium channels (for example, Home Box Office, Disney Channel), Pay-Per-View events, and equipment rental (decoders, remote controllers).
- Among third-party bill processing firms, CableData (Sacramento, CA) is the largest, handling approximately one-half of all CATV systems' billings. First Data Resources, Gill Management Services, and CableFacts also provide CATV billing services.
- CableData and First Data Resources are profiled in the next chapter, and processing opportunities in the cable television segment are analyzed in Chapter V.

### 3. SHARED TENANT SERVICES (STS)

- Shared Tenant Services involves the provision of business and telecommunications services in a building or office, including all support functions, by one centralized entity.
- Minimally, the facility contains:
  - A fourth generation PBX with simultaneous voice and data switching.
  - Local area network capability.
  - Remote and/or internal diagnostics.
  - Call detail recording or station message detail recording.
  - Least cost routing.
  - Shared trunks.
- Optionally, the STS facility may have integrated office systems, shared message centers, voice mail, facsimile, mainframe timesharing, and other services.
- STS facilities are being established by real estate developers often working with telecommunications equipment/service vendors and building control suppliers.
- Because facilities are shared, a method of billing members of the cooperative is needed, similar to the needs of large corporations for department or client chargebacks.

- While on-site processors may handle tenant billing, RCS services may be used by STS managers choosing not to manage this function themselves.

#### F. NEW SERVICES ARE EVOLVING

- In addition to the services above, telephone companies are joining others in new ventures which will require processing services, such as electronic mail, intra-LATA (local) packet networks, videotex, and public telephones accepting credit cards, with callers selecting from several alternative interexchange carriers.
- Exhibit III-7 summarizes issues in the telecommunications industry.
- The next chapter profiles processing services provided to the telecommunications industry and analyzes vendor strategies.

## EXHIBIT III-7

### TELECOMMUNICATIONS INDUSTRY ISSUE

- Divestiture
- Deregulation
- Increasing Competition
- Changing Relationships; AT&T/BOCs/  
Independents/IXCs
- Equal Access
- Complicated Bill Record Requirements
- Upgraded Facility Requirements
- Cellular Telephone
- Cable TV Data Service
- Increasing Data Traffic
- Future Service



#### **IV VENDOR PROFILES AND STRATEGIES**



## **IV VENDOR PROFILES AND STRATEGIES**

- This chapter profiles many of the companies providing processing services to the telecommunications industry and contains analyses of the strategies used and technological trends.
- Also included are descriptions of professional services, software, and turnkey systems offerings which may represent competitive technologies or complementary opportunities for RCS vendors.
- Further information about many of these companies can be found in INPUT's Company Analysis and Monitoring Service (CAMS).

### **A. RCS SERVICES TO THE INDUSTRY**

- Interviews were conducted with 17 RCS telecommunications vendor representatives; their services are summarized below and in Exhibit IV-1.
- I. ALLIED DATA, INC.
    - Allied Data (Olympia, WA) is owned by U.S. Intelco Networks, which in turn is owned by 160 independent telephone companies.

## EXHIBIT IV-1

## RCS TELECOMMUNICATIONS VENDOR SUMMARY

| COMPANY                       | TELECOMMUNICATIONS INDUSTRY SERVED |     |                        |          |              |     |      | PRIMARY RCS SERVICE   |
|-------------------------------|------------------------------------|-----|------------------------|----------|--------------|-----|------|---|
|                               | TELCO                              | IXC | Long Distance Reseller | Cellular | Mobile Phone | STS | CATV |   |
| Allied Data                   | X                                  |     |                        |          |              |     |      | Billing   |
| AUXCO                         |                                    | X   | X                      | X        |              |     |      | Billing, Order, Repair, Inventory Control                   |
| Bank of Illinois              | X                                  |     |                        |          | X            |     |      | Billing, Order Control                                      |
| CableData                     |                                    |     |                        |          |              |     | X    | Billing, Market Analysis                                    |
| Cellular Business Systems     |                                    |     |                        |          | X            |     |      | Billing, Inventory Control, Analysis                        |
| Cincinnati Bell Info. Systems | X                                  | X   |                        |          | X            |     |      | Billing, Order, Facilities, Construction Control            |
| Comshare                      | X                                  |     |                        |          |              |     |      | Administrative, Facilities Control                          |
| Computo-Service               | X                                  |     |                        |          | X            |     | X    | Billing, Accounting   |
| Computel                      | X                                  |     |                        |          | X            |     |      | Billing   |
| First Data Resources          |                                    |     |                        |          |              |     | X    | Billing, Work Order, Scheduling Control                     |
| McDonnell Douglas ISG         | X                                  |     |                        |          |              |     |      | Facilities Planning, Inventory, Ordering, Personnel Control |

## EXHIBIT IV-1 (Cont.)

## RCS TELECOMMUNICATIONS VENDOR SUMMARY

| COMPANY                     | TELECOMMUNICATIONS INDUSTRY SERVED |     |                        |          |              |     |      |  | PRIMARY RCS SERVICE |
|-----------------------------|------------------------------------|-----|------------------------|----------|--------------|-----|------|--|---------------------|
|                             | TELCO                              | IXC | Long-Distance Reseller | Cellular | Mobile Phone | STS | CATV |  |                     |
| Mid-America Computer        | X                                  |     |                        |          | X            |     | X    | Billing                                |                     |
| North Central Data Coop.    | X                                  |     |                        | X        | X            |     | X    | Billing, Engineering Suppcrt           |                     |
| Telecom MIS                 |                                    |     | X                      |          |              | X   |      | Billing                                |                     |
| TDS Computer Services       | X                                  |     |                        |          | X            |     | X    | Billing                                |                     |
| United Information Services | X                                  |     |                        |          |              |     |      | Internal Billing                       |                     |
| UDP                         | X                                  |     |                        |          |              |     | X    | Billing, Accounting, Inventory Control |                     |

- The company offers billing service, key entry, general accounting, customer account inquiry, and toll rating services.
- Services are provided to approximately 300 independent telcos and 200 non-telephone related industries.
- The \$5 million company estimates that 80% of its income is related to telephone industry services.
- Software for IBM PCs is also sold, as are consulting and other professional services.
- Allied Data is investigating acquisitions in future services such as videotex, electronic mail, and home banking.
- The company considers its affiliation with U.S. Intelco Networks, its client base acquired since 1967, its move toward microcomputer solutions for this vertical market, and a growing client base using its micro-based products as its major strengths.

## 2. AUXTON COMPUTER ENTERPRISES COMPANY (AUXCO)

- AUXCO (Maitland, FL), formed in 1969, specializes in services and systems for the telecommunications industry.
- In addition to management consulting and customized software, the firm offers processing services for long distance carriers, resellers, cellular operators, and paging services.
  - CompuNetwork provides calculation of service charges, billing, adjustments, and customer records maintenance, as well as payment processing and collections, with credit information integrated into the customer data base. Volume or percentage discounts can be calculated if offered.

- CompuCellular handles similar functions and includes order processing, repair tracking, and inventory management, and can provide market analysis information.
- The company is also developing software for a planned cellular clearinghouse for roaming applications.
- Software licensed by the company for a customer's IBM processors include:
  - Service Order Customer Record and Terminal Entry System (SOCRATES).
  - Line Utilization Cable Assignment System (LUCAS) for data conversion to create the facility's data base, service order processing, cable throw information, repair processing, inquiry support, and management reports.
  - Central Office Equipment Inventory (COEI) for providing telephone number and frame management.
  - Engineering Work Order (EWO) for inventory information of outside plant cable.
- The company is processing for 14 cellular companies, including the subsidiaries of Bell South, Southwestern Bell, Contel, Pacific Telesis, United Telecommunications, and others representing 34 systems. The company claims nearly one-half of the wireline cellular processing business.
- Other clients include Microtel (Boca Raton, FL) and two other long distance resellers for billing and processing services.

- The company sees its cellular expertise as a principal strength, along with service and product quality.
- The company claims 1985 revenues of \$28 million, with 25-30% derived from remote computing services to the telecommunications industry.

### 3. BANK OF ILLINOIS DATA PROCESSING DIVISION

- The Champaign (IL) bank operates a data center which provides processing services to telecommunications and other entities.
- Fifty-six regional independent telephone companies and approximately six large cellular operators use billing and other services.
  - The biggest cellular user is GTE Mobilnet.
  - The company plans to offer processing services to cellular operations serving approximately 50 national markets by the end of 1986.
- The bank sees its major competitive strengths as its stability. Backed by a financial institution, it is able to expand without needing external resources. It also competes based on price and superior service to its customers.
- Background on how the bank developed its cellular service describes some of the special problems found in the industry and how one RCS addressed them.
- The bank traces its involvement in cellular billing to the early days of the service. In 1978, it was asked by Illinois Bell to process its cellular billing. Chicago was the first to go "on-line" with a commercial cellular system, and the bank was involved in the first testing phases.
- The bank originally thought it could use landline telephone billing software for cellular, but quickly recognized that a more flexible system was needed.

- It devised a relational data base linked to the billing system to support customer account inquiries.
  - Management reporting functions were integrated into the system, primarily for marketing related analyses.
  - A micro-based order entry system was designed. Service order screens are custom tailored by the cellular company. Data are transmitted to the billing service on a scheduled basis.
  - In addition to collecting time/toll charge data and assembling and rating the information, each message is checked for area code and exchange. Long distance message fields are expanded to calculate toll messages.
  - Local telcos often record toll information. This is used to verify interexchange carrier toll billing.
  - The final data are compiled to produce customer bills.
- One of the biggest challenges which faced the bank was customer support.
- The bank had a previous relationship with the telco which helped in properly orienting the customer support group to cellular.
  - Due to rapid changes in billing schemes, the support group is needed to field subscribers' questions.
- Bank personnel work with cellular marketing departments to provide insight into the requirements for data processing due to service pricing changes. Enough time is now allowed for the necessary programming changes, which are made easier due to a flexibly designed system.

#### 4. CABLEDATA

- CableData was founded in 1965 as U.S. Computer Systems and provides interactive and remote batch processing as well as turnkey systems to the cable television industry.
- INPUT estimates that the majority of the private company's revenues are derived from processing services to over 1,000 CATV companies.
  - The companies transmit subscriber information to CableData data centers.
  - CableData generates and mails statements to subscribers.
- Additional applications are available, including entry, scheduling, installer check-in, converter inventory control, payment posting, collects, refunds, management reports, customer billing, and service history.
  - The company also offers turnkey processing systems.
  - It provides "value added" services to its subscribers, such as demographic marketing data analysis services. The information includes:
    - Household demographic profiles.
    - Comparisons of subscribers and non-subscribers.
    - Profiles of premium pay service subscribers.
    - Analysis of cancelled service subscribers.

## 5. CELLULAR BUSINESS SYSTEMS, INC. (CBSI)

- Among CBSI services are:
  - Customer data base management and inquiry support.
  - Telephone number inventory management.
  - Call data processing, including call rating.
  - Billing with support of multiple tariffs, tax applications, and multiple formats, with reconciliation of charges from connecting carriers.
  - Management report generation.
  - System optimization, integrating subscriber statistics, market projections, and demographic analysis for engineering models.
  - Statistical reporting of traffic and subscriber activity.
  - Marketing support, including lead analysis, order entry, and tele-marketing.
  - Immediate billing for car rental cellular services.
  - Inventory control.
- Services are sold to cellular operators, resellers, equipment vendors, installers, and maintenance shop operators, supporting remote access communications between these entities.
- CBSI also licenses software and provides professional services for companies establishing their own operations.

- The company claims an advantage in providing its broad services to all segments of the cellular industry, and also claims to have more experience in cellular data processing and telco operations than any other firm involved in cellular billing service. Company President Martin Cooper is an acknowledged pioneer in mobile telephony.

## 6. CINCINNATI BELL INFORMATION SYSTEMS, INC. (CBIS)

- CBIS (Cincinnati) provides telecommunications software and services to BOCs, independents, and offshore telecom companies for billing and outside plant management, and has ventured into processing services with a cellular radio offering.
- The company formerly operated as the Information Systems Department of Cincinnati Bell Telephone, and was incorporated in 1983 as a wholly owned subsidiary of the telephone company. It has two processing services:
  - Cellware, an integrated cellular message processing, account management and customer billing system for cellular operators and resellers, rates calls and supports other on-line features such as order entry, bill adjustments, and management reporting.
    - Data is received from cellular switches and guided to the customer's account for rating. CBIS issues bills to cellular customers.
    - The software can be customized. Pricing is based on the volume of transactions.
  - Inside Line was introduced in February 1985. This batch processing service provides a choice of 40 reports to aid telephone network management.

- The customer provides CBIS with Station Message Detail Recording (SMDR) tapes and selects desired reports, and CBIS produces telephone usage reports.
  - While most CBIS products and services are targeted to the telecommunications industry, Inside Line can be used by any large corporation.
  - The company plans to offer the software, now available through the processing service, as a package in the future.
- Among CBIS's software products are:
  - Customer Records Information System (CRIS) for customer billing and recordkeeping.
  - A customer order entry and distribution system (OS/ORDER) providing interactive on-line entry, correction, and updating.
  - Message Processing System (MPS), a consolidated toll message and usage billing system which can handle all types of service, including access charges, mobile and cellular service, WATS, coin service, and local service.
  - A mechanized exchange customer cable record system (OS/PLANT) for outside plant administration.
  - Centralized Online Customer Records Information System (COCRIS) for customer inquiry, adjustments, service denial/restoration orders, and other related tasks.
  - A construction force management system (OS/FORCE-PLUS).

- Two cellular operators representing 15 cities currently use Cellware services. Cincinnati Bell is the primary telco user, along with AT&T Communications for Megacom billing, a WATS-type service, and for other new services.
- The company reports total 1984 revenues of \$30.3 million. INPUT estimates noncaptive revenue of \$6.06 million. INPUT attributes 13% of CBIS's total revenue to processing service functions.
- CBIS has acquired Creative Management Systems, Inc. (McLean, VA), a designer of telephone call accounting software systems, which will operate as a subsidiary of CBIS and the COMMTRACK unit of United Information Services (see United's profile below).

## 7. COMSHARE, INC.

- Comshare (Ann Arbor, MI) was founded in 1966 and is one of the earliest companies to offer commercial timesharing services.
- Comshare specializes in several RCS markets, including telecommunications, human resources administration, and data base management systems.
- The telecommunications industry applications are called 4.I.I. They include an integrated system for telcos to control administrative activities such as telephone number assignments and voice traffic load balancing.
- Comshare recognizes that the deregulation of AT&T has opened additional markets in selling this type of service to independent telephone companies. Also, Comshare has found new customers for System W, an integrated DSS mainframe and micro product. System W combines business reporting, modeling, forecasting, statistical analysis, spreadsheets, data management, graphics, communications, and interfaces for data acquisition for external software products.

- The principal 4.1.1 product is MIDAS (Mechanized Dial Assignment) which changes office records when a service order is written and dynamically recalculates load balance when equipment or circuits are added or removed from service. On-line status reporting is provided, among other capabilities.
- Incorporated in MIDAS are:
  - EBIS for Equipment Balance Information.
  - Midas Automated Switch Translation (MAST) for analog-to-digital central office switch conversions and translations. It also audits, validates, and adjusts new office loads before installation and creates line and directory number translation tapes for the central office switch manufacturer to use in creating a new switch load tape.
  - Mainframe Administration Program (MAP) incorporates all MIDAS functions plus manages the main distribution firm using the short jumper concept. Short jumpers are the cross connections between the central office and cable equipment on large main distribution frames where telcos do their wiring.
  - The Plant Administration Software System (PASS) manages outside plant and cables.
- The applications are available through remote computing and can be licensed for IBM MVS environments.
- The company sells a single turnkey system for directory assistance which operates on Data General minicomputers.
- The company's products are sold to all major independent telcos including Contel, GTE and United companies, several Caribbean telcos and many

smaller domestic telcos, including Standard Telephone and Enterprise, for a total of between 25-30 companies.

- Comshare has had difficulty selling into BOC environments because of competitive software products from AT&T and Bell Communications Research (Bellcore) which had previous involvement with the BOCs for these types of applications.
- The company claims 1985 revenues for 4.I.I. products between \$9 and \$10 million. Its major strengths are its software for IBM systems configurable to any central office switch. Its major competitor (AT&T/Bellcore) requires telcos to use AT&T or other hardware for software installation, while 4.I.I. products are available both as software or as remote computing services.
- Comshare also has professional services available for large, one-time applications as well as field services for routine consulting and maintenance.

## 8. COMPUTOSERVICE, INC.

- This Mankato (MN) firm is owned by the Mankato Telephone Company and provides toll revenue and accounting services to approximately 80 independent telcos, 10 CATV firms, and 18 mobile telephone systems in the Midwest.
- INPUT estimates the private company has approximately \$2 million in annual revenues. ComputoService employs approximately 75 people and receives approximately 75% of its revenue from services to the industry.
- Software is available for Texas Instrument computers.
- The company claims its 21 years of specialization in services to the industry are a major competitive strength.

9. COMPUTEL

- This privately held Blair (NE) firm is affiliated with the Great Plains Telephone Company which owns several independent telcos in the state and recently acquired the Nebraska holdings of Continental Telephone. The company employs 15 people. INPUT estimates its annual revenue below \$500,000.
- It provides billing, mailing, and toll rating services to approximately 30 independent telcos and three mobile telephone and CATV operators in seven states.
- In association with another company, Computel sells general accounting software and provides programs for billing at no charge with data transmitted to Computel for processing by approximately 12 remotely located telcos.
- The company considers its specialized involvement in the telephone industry as its major strength.

10. FIRST DATA RESOURCES, INC.

- First Data Resources (Omaha, NE), founded in 1971, provides cable television services, debit and credit card transactions, and processing services for telemarketing, cash management, airline reservations, and nine-digit ZIP code addressing.
- American Express Travel Related Services Company is a major holder of the company's stock.
- Cable System Services accounted for 4% of the company's 1984 revenue of \$110.1 million.

- Services are provided to over 150 cable systems, including Multiple System Operators (MSOs) such as Group W Cable, Warner Amex Cable, TeleCommunications, Inc., Cox Cable, Continental Cablevision, and American Cable-Systems.
- Processing services include:
  - Subscriber billing through cycle management with descriptive statements including individual itemizations and pay-per-view breakdowns by date and time.
  - Centralized payment processing.
  - On-line subscriber inquiry, including collection data.
  - On-line data base management, including work order monitoring, scheduling, and dispatching functions.
  - Consolidated management reporting for financial, operational, and sales/marketing control.
- In 1984, First Data acquired KMP Computer Systems, expanding its offerings to include microcomputer subscriber billing software targeted to systems with 200-20,000 subscribers.

## II. MCDONNELL DOUGLAS INFORMATION SYSTEMS GROUP (ISG)

- McDonnell Douglas Automation (McAUTO) acquired Computer Sharing Services (a division of Rio Grande Industries) of Denver in January 1984, and Tymshare in April 1984. These companies' services were combined with some of McAUTO's mainframe products and services to form the McDonnell Douglas Communications Industry Systems (CIS) Company, a part of ISG, consolidating overlapping products and sales forces.

- McDonnell Douglas ISG offers processing services directed to both independent telcos and BOCs. These include adaptations of general services as well as those especially designed for the industry.
  - The Outward Telephone Information System (OTIS) tracks telephone set inventory, movement, and performance to increase telephone set recovery and reduce replacement costs.
  - The Pricing and Loading System (PAL) assists telephone companies in managing the repair and maintenance of complex switching equipment.
  - Several facilities administration applications are included in the Management Scheduling and Control System (MSCS), adapted for telephone applications. It is an integrated system for analog to electronic or digital switches conversion, or for other large-scale project management.
    - . Cost Planning and Evaluation System (COPES) monitors and controls costs.
    - . Line Item Status System (LISS) helps project managers cope with chronic late arrivals of needed materials and engineering drawings, reporting the status of each task and when it must be accomplished.
    - . Customer On-Line Order Processing System (CO-OP) controls the order processing cycle using a data base to determine order and inventory level status. It is similar to the Purchase Order Status and Tracking System (POST), an on-line data base system which centralizes procurement.

- Force Management System-II (FMS-II) is used to schedule telephone operator and other personnel schedules, with forecasting and budgeting capabilities.
- Telephone Industry Marketing System (TIMS) is designed for independent telcos to track equipment, billing data, customer account assignment, and sales staff performance.
- Centralized Traffic Reporting and Collection System (CENTRACS) is also targeted to independent telcos.
  - . PBXs are tied to central offices where minicomputers collect telephone traffic data such as calling volume, central office equipment loads, calling efficiency, telephone facilities assignments, revenue information, and studies on customer equipment.
  - . CENTRACS polls the central offices to measure traffic. Data are processed at a CIS computer center with summaries sent to division offices for analysis and forecasting.
- Directory and Equipment Number Status System (DENS) counts and assigns telephone and equipment numbers and provides special purpose reporting.
- Cable and Pair Status System (CAPS) provides inside plant and mainframe administration.
- Mechanized Assignment and Control System (MAC) controls inside and outside plant administration.
- Purchase Order Status and Tracking System (POST) supports centralized purchasing, automates vendor selection, generates purchase orders, coordinates receiving functions, and issues daily exception reports.

- McDonnell Douglas CIS is the largest processor for the industry outside the former Bell system. It has all 22 BOCs, the RBOCs, and AT&T as customers, as well as the major independents.
- CIS manages the equal access balloting system for several of the BOCs to control consumer long distance service selection.
- CIS is also working on joint ventures with telcos for shared tenant services and is developing a cellular telephone clearinghouse application.

## 12. MID-AMERICA COMPUTER CORPORATION (MACC)

- MACC (Blair, NE) is a privately held, \$2 million processing firm which services 214 independent telcos, 30 CATV firms, and 6 mobile telephone systems in 11 midwestern states. MACC employs 25 people.
- MACC provides billing services, bill mailing, and toll processing. Additionally, general accounting and payroll applications are available on the mainframe, but the company is also implementing these types of general business applications on customer location microcomputers with centralized support from the firm.
- MACC also sells turnkey billing systems based on IBM PC/ATs using MACC developed software.
- MACC is the national data administrator/billing center for the Air-Ground Radio Automated System (AGRAS) which provides dial-up telephone service to general aviation (private) pilots. Eventually, 90 transceiving terminals will be installed nationally for this service.

### 13. NORTH CENTRAL DATA COOPERATIVE (NCDC)

- NCDC of Mandan (ND) is a data processing cooperative providing service to member telcos and other independents as well as to electric and other rural utility companies.
- Services include billing, general accounting, and engineering support services for cable and plant records, outage reporting, and other engineering applications.
- A total of 48 telcos are served, including the members of the cooperative in 17 states. Two cellular systems, 15 mobile telephone, and 7 CATV firms also use NCDC services.
- Turnkey systems for Burroughs processors are sold, and software maintenance and consulting services are available.
- The company claims annual revenues of between \$1.8 and \$1.9 million for services to the telecommunications industry.
- NCDC's strengths result from its cooperative charter requiring it to operate at true costs. Also, software and services have been developed by cooperative members to address their needs directly.

### 14. TELECOM MIS, INC.

- This Upper Darby (PA) company was separated from its parent firm, United Technologies, in October 1985.
- Telecom MIS operates an RCS targeted to shared tenant services and long distance resellers.

- Tenant and Reseller's Billing Service (TARBS) generates bills from PBX CDR or SMDR records provided on magnetic tape from the customer's telephone switch, or the data may be polled nightly by the RCS.
- A subscriber or tenant accesses the company's switch and keys in an access code manually or through an automatic dialer.
- Billing data is processed monthly.
- Resellers can design the format and include the direct distance dialing (DDD) equivalent on the bill as a marketing tool to remind tenants of their savings compared to DDD.
- Telecom MIS also sells a system and licenses software called Telephone Accounting Management Systems (TAMS) directed at large corporations to provide detailed call records, analysis reports, and chargeback data.

## 15. TDS COMPUTER SERVICES

- TDS, based in Madison (WI) is a wholly owned subsidiary of Telephone and Data Systems (TDS), a telephone operating group.
- The company primarily provides services to TDS companies including 70 telcos, 16 CATV firms, paging and mobile telephone companies operated by the telcos, and U.S. Cellular, a subsidiary of TDS. The companies are distributed throughout the midwest and eastern states.
- TDS Computer Services claims annual revenues of approximately \$7 million.
- Systems are also sold to companies other than those affiliated with the parent firm. TDS is developing distributed systems; however, in the case of long distance processing, it sees economies of scale in maintaining centralized processing.

## 16. UNITED INFORMATION SERVICES

- The Overland Park (KS) company, once part of United Telecommunications, was sold to Control Data Corporation in 1983. In October 1985, Cincinnati Bell Inc. announced an agreement in principle to purchase the COMMTRACK unit of United.
- COMMTRACK, which employs 35 people, will become part of Cincinnati Bell Information Systems.
- COMMTRACK's services are used by large telecommunications users and by two independent telcos and two BOCs for internal Station Message Detail Recording (SMDR).
- The company also provides billing services to five long distance resellers.

## 17. UNIVERSAL DATA PROCESSING, INC. (UDP)

- UDP (San Antonio, TX) operates an RCS for approximately 30 independent telephone companies in Texas and provides professional services to the industry. The firm has approximately 10-12 employees.
- Among the services provided are billing, general accounting, inventory management, and tool rating. It also handles bill processing for a few cable television firms and is investigating cellular radio opportunities.
- In addition to processing, the company sells turnkey systems using its own software and also microcomputers.

## B. PROFESSIONAL SERVICES

- Many processing firms additionally provide professional services in software development, systems design, and implementation.
- This section provides examples of professional services used by telcos to give indications of additional opportunities for RCS firms with these capabilities.

### I. AMERICAN MANAGEMENT SYSTEMS, INC.

- For over nine years, AMS (Arlington, VA) has been providing systems development and support services for MCI in the area of order processing, billing, accounts receivable, and collections.
  - AMS has managed projects for the parent company and subsidiaries, including MCI Telecommunications, MCI International, MCI Digital Information Services, and Western Union International.
  - AMS reportedly plans to develop packaged software tailored to the telecommunications industry segment.

### 2. COMPUTER HORIZONS CORPORATION (CHC)

- This New York based firm is primarily involved in custom software analysis, design, and programming services to the communications as well as other industries.
- Fiscal 1985 results show that 46% of the company's operating revenue of \$44.4 million came from the communications industry. The company is maintaining a compound annual growth rate in revenues of 35%.

- However, CHC experienced slowing growth in the communications segment and is diversifying into other areas while maintaining its long-term relationships with AT&T and the divested BOCs.
  - The company's future strategy is to leverage its communications and financial segment experience into new markets such as utilities, defense, and manufacturing where its fastest growth rates have been over the past two years.
- Among 1984 projects were design and development services for various aspects of new telephone billing systems created by AT&T's reorganization as well as other administrative and financial information systems.
  - CHC has done work for 15 units of AT&T, which was its largest single 1985 client, contributing 22% of revenues in fiscal 1985.
  - However, AT&T's consolidation efforts have affected CHC's business. Administrative offices have been closed and AT&T asked for volume discounts from its vendors, although AT&T's needs for services are expected to continue growing despite these measures.

### 3. COMPUTER SCIENCES CORPORATION (CSC)

- In late 1983, CSC (El Segundo, CA) was awarded a five-year contract with an estimated value of \$30 million to continue maintenance and enhancement work on what it calls "the largest application system in commercial use" for AT&T Communications.
  - The Trunks Integrated Records Keeping System (TIRKS) automates provision and planning management of telephone circuits, facilities, and equipment.
  - It has more than 350 data bases and over 18,000 software modules.

- Work on the system, developed over a ten-year period in conjunction with Bell Laboratories (now part of AT&T Technologies), is being done at AT&T Communications' Cincinnati data center.
4. DATA ARCHITECTS INC. (DAI)
- DAI (Waltham, MA) management believes the growth in demand for voice and data telecommunications services has led to major communication network expansions by carriers and new requirements for automated support systems to collect billing information, manage switched networks, and market new services.
    - Telecommunications contracts represented an estimated 40% of its 1984 revenues of \$15.5 million.
    - In January 1983, GTE Sprint awarded DAI a contract to develop and install the Call History Information Processing System, a nationwide network of more than three Tandem NonStop computers located at each major voice switching center. The system collects, processes, and relays the records for all toll calls to national centers.
    - DAI was also reportedly negotiating a contract with a western Bell Telephone regional holding company to provide a major business support system.
  - Exhibit IV-2 summarizes the professional services of these profiled firms.

EXHIBIT IV-2

EXAMPLES OF PROFESSIONAL SERVICES  
TO TELECOMMUNICATIONS COMPANIES

| COMPANY                           | PROJECT   | CLIENT     |
|-----------------------------------|---|------------|
| American Management Systems, Inc. | System Development:<br>Order Processing, Billing,<br>A/R, Collections | MCI        |
| Computer Horizons Corporation     | System Development:<br>Billing, Administrative,<br>Financial          | AT&T       |
| Computer Sciences Corporation     | Maintenance and Enhancement:<br>Circuit Provision<br>and Planning     | AT&T       |
| Data Architects Inc.              | System Development:<br>Toll Call Processing                           | GTE Sprint |

## C. TURNKEY SYSTEMS

- Turnkey systems represent a competitive technology to RCS services in the telecommunications industry.
- The following profiles are examples of such systems now available to indicate this competitive factor and also to help identify opportunities for RCS firms with such capabilities, either alone or through strategic partnering with hardware and software firms.

### I. AMERICAN COMPUTER AND ELECTRONICS CORPORATION

- This Gaithersburg (MD) company primarily provides software and systems, but also operates an RCS for telecommunications departments such as those found in universities. It has been providing services for 20 years.
- The RCS service primarily processes call records. Systems are sold to telcos and to telecom departments for equipment inventory management, call record processing, automated directories, and plant cable management.
  - Telmars is directed to telecommunications departments.
  - Telac is directed to telcos.
- The company-written software operates on DEC VAX and Texas Instruments hardware.
- The privately owned company attributes 30% of its revenues to telco sales, 30% to telecommunications departments, 20% to RCS functions, and the balance to consulting services.

## 2. AT&T/BELL COMMUNICATIONS RESEARCH

- AT&T and Bellcore offer versions of the COSMOS (Computer System for Mainframe Operations) minicomputer software package to mechanize subscriber line equipment and related wire center activities.
- The system maintains a data base with subscriber and physical inventory information including assignment of line equipment, telephone numbers, tie cable pairs, bridge lifters, and message registers for central office record management. It also handles load balance calculations, status reporting, and other functions.
- Reports available include pending service order, load analysis, jumper distribution, and cable usage. The data base helps in office rearrangements and in administering special services such as foreign exchange and Centrex.
- The AT&T version is packaged for the company's 3B20 computers while Bellcore's version is for DEC PDP-11s.

## 3. AT&T NETWORK SYSTEMS

- AT&T Network Systems began offering the Billdats system early in 1985 to provide automated bill data collection in association with central office equipment.
- Configured on an AT&T 3B20 or 3B5 UNIX computer, the system automatically transmits billing information from up to 36 central offices (24 simultaneously) to a central customer billing center or to a billing service. This eliminates the need to transport computer tapes physically when the system collectors are located in the telephone company billing center.
  - Billdats transmitters are located at central offices and Traffic Service Position System sites (for operator-assisted calls).

- Data are transmitted over dedicated or dial-up links to system collectors at between 4,800 and 56,000 bps, depending on switch size.
- The data are placed on disk storage, processed, and transferred to computer tapes in the standard Automatic Message Accounting Standard Entry (AMASE) format used by most billing computers.
- According to AT&T, the system can work with almost any central office switch, including non-AT&T equipment.
  - Transmitting features are incorporated in the 5ESS switch and 4ESS and IAESS switches with Attached Processor Systems.
  - Microprocessor add-on transmitters can be installed on smaller switches, including the Number 5 Crossbar.
- The format of the billing data will reportedly easily accommodate future calling features. The system is modular and can grow with billing data volume.

#### 4. QUINTREX DATA SYSTEMS (QDS)

- QDS (Cedar Rapids, IA) sells an IBM-based turnkey system using software written by QDS designed for small independent telephone companies with 500 to 18,000 subscribers.
- Hardware is maintained by IBM, and software maintenance is handled through dial-up support.
- Systems available include: Information and Billing, Toll Investigation, Directory Assistance, Service Ordering, Toll Rating, Mobile Phone Rating, Outside Plant Records, Inventory Control, and Carrier Access Billing as well as general accounting systems.

- Systems are priced between \$27,000 and \$150,000. The company says that on-staff programmers are not required.
- 5. VISTACOM
- Vistacom (Owings Mill, MD) is an affiliate of long distance reseller Telesaver. It sells an integrated system called Telcro to resellers for direct billing output.
  - The system accepts incoming and outgoing carrier phone lines (now most commonly equal access lines), validates incoming calls to verify company customers, and evaluates available outgoing facilities to determine the least cost routing.
  - Upon termination, call data is recorded.
  - The billing program holds all appropriate tariffs. At resale company option, a customer's bill can be compared with what the charges would have been through another carrier such as AT&T to show the savings realized.
  - Billing can be based on mileage, and volume discounts can be programmed into the system.
  - Report programs for network analysis and line optimization can be generated. A data base program activates customers and maintains subscriber records.
- The Telcro system has applications in the shared tenant services market, and cellular resale opportunities are being evaluated by the company.

#### D. TECHNOLOGICAL TRENDS

- Several trends emerge from the analysis of RCS, professional services, and turnkey systems.
  - Small, independent telcos are recognizing the data reporting requirements of the new environment.
  - As the number of subscribers increases (especially in high-growth areas such as the Sunbelt), central office upgrades will be required. This, in turn, requires management services to handle conversions from obsolete analog switches and from manual, paper-based billing and facilities management methods.
  - New digital central office switches have Call Detail Recording capabilities and can be remotely polled for data used for bill processing.
  - Micros are leading to distributed processing with telco-owned micros front-ending remote processing services.
  - The integration of customer records, moves and changes, and billing data with accounting and analysis applications is becoming important, particularly in competitive markets such as cellular.
- These technological trends, which must be recognized by service providers, are shown in Exhibit IV-3.
- The next chapter describes the findings of INPUT's telecommunications company research program, analyzes existing and emerging markets, and forecasts the market.

## EXHIBIT IV-3

### TECHNOLOGICAL TRENDS

- Increasing Data Reporting Requirements
- Central Office Upgrades Need Project Management
- Remote Central Office Polling
- Distributed Processing: Micros as Front-Ends
- Integrated Applications

## **V MARKET OPPORTUNITIES, RISKS, AND ANALYSIS**



## V MARKET OPPORTUNITIES, RISKS, AND ANALYSIS

- This chapter describes users' views and issues as revealed in the research program. It also analyzes opportunities and risks for processing services in the telecommunications industry by segment as well as industry-wide. INPUT's market forecasts complete the chapter.

### A. USER VIEWS AND ISSUES

- This section provides perspectives on issues facing telecommunications firms that affect their processing activities and needs.

#### I. REASONS FOR USING EXTERNAL PROCESSING

- Independent telcos interviewed by INPUT that use RCS companies for bill processing do so primarily because of staff limitations and the perspective that their small size makes this approach most cost effective.
- Telcos which handle their own processing want to maintain operational control and integrate their other business applications such as accounting, capacity management, and marketing.
- Some telcos handle their local billing internally while long distance bill processing is handled externally.

- Firms tending to their own needs were highly unlikely to go to external processing in the future.

## 2. SATISFACTION WITH RCS FIRMS

- Firms using external services rated their satisfaction levels at midrange.
  - Those giving unfavorable ratings cited their RCS's inability to keep up with the rapid changes in reporting requirements now being experienced in the industry; in a static environment satisfaction levels would be higher.
  - This underscores a need for RCS companies to stay current with tariff filings and related matters.
  - Some also felt the fees charged for processing were too high.
- The likelihood that RCS users would change processing firms correlates to satisfaction levels and the perception that the RCS is informed about the industry. Several of the telcos interviewed use the processing services of a larger telephone company, sometimes out of state. In this case, the service provider not only needs to stay current on its own state requirements, but also needs to track tariff changes in the other states being served.

## 3. THE TREND TO INTERNAL PROCESSING

- Telcos using RCS firms estimated the likelihood that they would move to internal processing within the next five years as fairly high, with some indicating they were doing most of what is required now. Others are aware that internal system prices are coming down. Several small companies which recently moved to internal systems are using general office systems for processing.

- Exhibit V-1 shows user ratings on these issues.

#### 4. EFFECTS OF AT&T TAKEOVER OF LONG DISTANCE PROCESSING

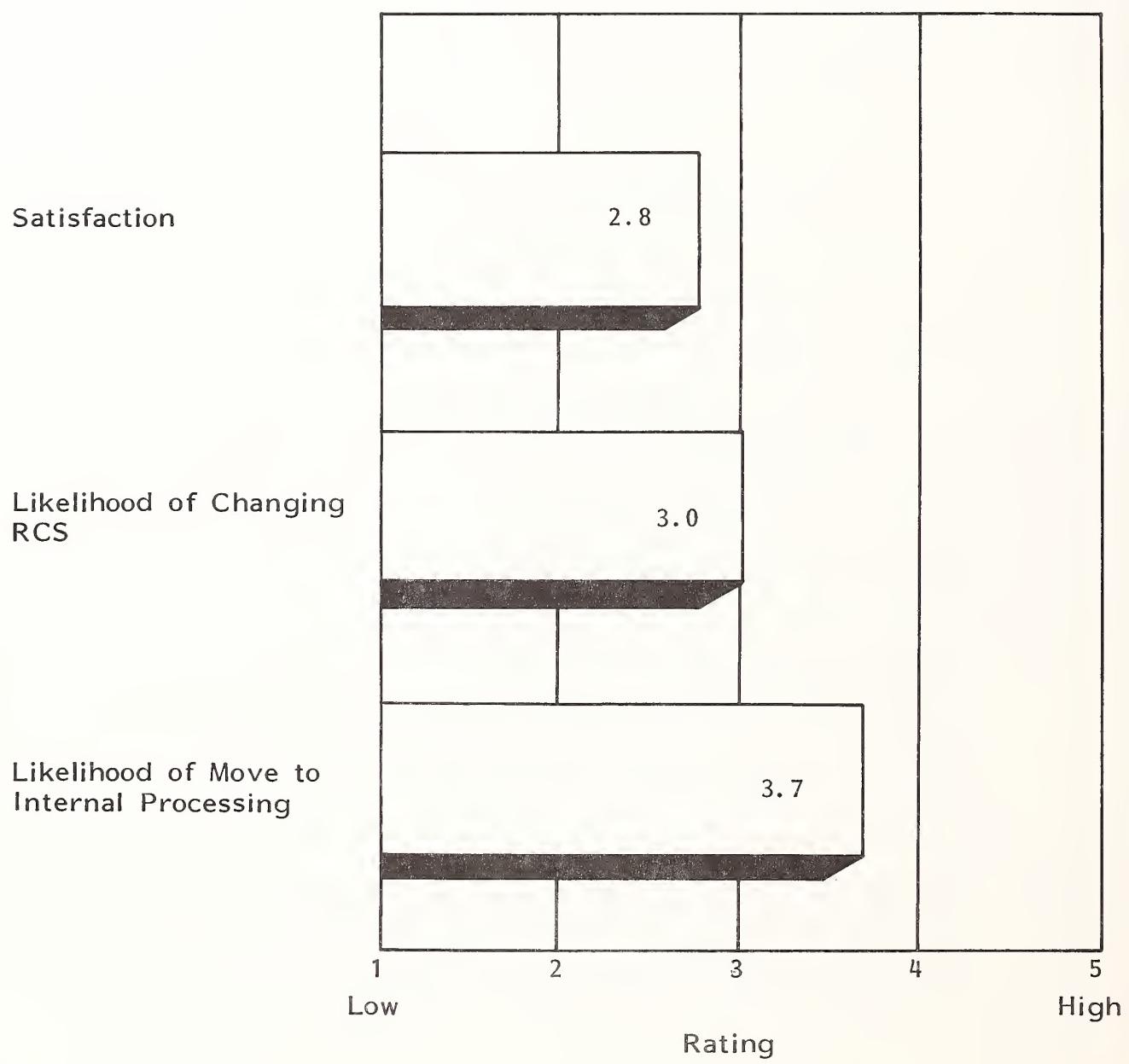
- AT&T has signaled its intention to take over processing for long distance and other services offered through their facilities.
  - Telcos now handling their own processing reported they would direct any newly available capacity to the applications backlog and in some cases to office systems.
  - One major operating group plans to consolidate its data centers by closing one of three such centers.
  - Some observers feel that although AT&T's takeover of its billing would first affect the BOCs and larger independents, the newly available capacity would lead those companies to take over their own billing operations which are now contracted to smaller telcos in their states who, in turn, often use RCS firms.

#### 5. SPECIAL/FUTURE SERVICES IMPACT

- Telcos interviewed saw no impact on their processing needs as a result of offering special services such as custom calling, call forwarding, and/or conferencing since these activities are controlled and reported automatically by digital central office equipment.
- Smaller telcos do not anticipate any near-term impact of future services such as videotex, home banking, or teleshopping on their processing since they feel such applications are unlikely to be implemented in their rural regions.

EXHIBIT V-1

USER RATINGS  
INDEPENDENT TELCOS USING RCS



- This perception notwithstanding, INPUT believes those interviewed are underestimating the impact of emerging and future services on network volume.
  - While rural areas may experience less growth than urban centers due to these services, there will be increasing network traffic in all areas due to applications such as Automatic Teller Machines (ATMs), Point of Sale (POS) terminals, and credit card authorizations, in addition to other applications such as electronic mail and inter/intra corporate data exchanges.
  - The fact that value added networks (VANs) rather than the public switched telephone networks (PSTN) will most often be used for these applications does not mean the PSTN will not be impacted. Access to VAN nodes in many areas will require long distance interexchange calling.
- These factors are anticipated in the telecommunications processing market forecast later in this chapter.

## **B. SERVICE PRICING**

- Billing services pricing is generally done on a per thousand basis. Customers recently inputting their own service orders on terminals or micros are given a discount.
- Pricing was formerly on a single level, but due to industry changes and since telephone companies have different requirements, services are now individually priced.
- RCS firms providing billing services charge between \$0.20 and \$0.25 per bill. Toll rating is priced additionally at \$0.025 per record. Postage for mailed bills is extra. Cooperatives operate on a true cost basis, and their rates are lower.

- Increasing micro usage by telcos will reduce fees paid to processing firms since the customer handles data entry.
- Costs are likely to increase for firms which provide billing services, in part due to the increasing costs of paper forms, system development costs, and labor expenses. Adjustments in service fees are likely as some services now support others.

## C. OPPORTUNITIES IN EXISTING MARKETS

### 1. AT&T

- There are few, if any, processing opportunities for independent RCS vendors with AT&T, which is largely self-sufficient.
- However, there are professional services opportunities in developing large scale systems. An example is Computer Sciences Corporation's work on TIRKS, discussed in the previous chapter.

### 2. BOCs AND LARGE INDEPENDENT OPERATING COMPANIES

- Similarly, the opportunities with the Bell Operating Companies and large independents are also limited, but the need for professional services may be even greater since these firms have fewer resources than AT&T.

### 3. INDEPENDENT TELEPHONE COMPANIES

- Typically, the larger independent telephone operating groups provide bill processing services for their operating companies as well as for unregulated subsidiaries such as answering services, supply companies, cellular telephone, and cable television interests.

- Facilities management processing, such as that offered by Comshare and McDonnell Douglas, will be used by independents or by the installation contractors of smaller telcos who do not maintain their own plant.
- Small, "truly" independent telcos are most likely to use outside billing processing services.
  - INPUT estimates that 58% of the 1,440 independent telcos use RCS services at least for bill processing.
  - Those with their own capabilities have the resources and volume to justify their own internal systems.
  - They also wish to maintain control and closely integrate bill processing with general accounting applications.
  - An independent telco with its own processing capabilities may sell services to others, including affiliated utility firms.
  - Services marketing by independent telcos are likely to be limited because of staff size, processing capacity, and programming flexibility.
  - In three cases, bill processing firms are jointly owned and operated by several independent telcos.
- RCS opportunities with independents will be found with small, as yet uncomputerized, telcos who will need to improve their current manual systems to meet new billing data/reporting requirements. However, the size of this market is relatively small.
  - Although INPUT estimates that there are approximately 700 independent telcos in this category, they have under 2,500 subscribers each, and in some cases, only a few hundred.

- The volume such processing represents may be too small for many RCS firms to consider; rather, these telcos may be better candidates for turnkey systems.
- There may be opportunities for RCS firms to win larger independent telephone company processing business in competition with existing services; however, to do so the RCS must provide enhanced services and should capitalize on the weaknesses of the typical, small firms now providing such services. One option is to acquire smaller RCS service bureaus.
- Conversely, small RCS firms benefit from personal relationships in maintaining their independent telco customer base and are able to provide more personal service than a larger firm.

#### 4. LARGE VERSUS SMALL RCS

- The size of a large RCS gives it no special advantage over smaller competitors because markets are contested on a separate basis.
- Many small firms specialize, and therefore have an advantage over a larger firm which offers general services, because they do not have the higher costs of larger companies, yet can provide clients with specialized expertise.
- Principle differences among competing RCS firms are product function, ease-of-use, quality of service, technical expertise, documentation, and client training.
- RCS vendors interviewed did not anticipate the entry of larger traditional RCS. They felt that the volume of business would be too small for larger companies to consider and that larger RCS firms often do not have telephone industry expertise.

- The exception is the expected involvement of AT&T in managing its own long distance and other service billing functions. The first to lose AT&T's business will be the RBOCs, and later, the first tier of larger independent telcos.

#### D. OPPORTUNITIES IN EMERGING MARKETS

##### I. THE CELLULAR PROCESSING MARKET

- Early projections for cellular demand were overly optimistic. Instrument prices, monthly service charges, and airtime rates remain too high for mass acceptance. High prices are required to recover research and development costs.
- According to the Cellular Telecommunications Industry Association, by the end of 1985 there were approximately 235,000 cellular telephone installations.
  - Approximately 80 wireline and only 20 non-wireline systems are operational.
  - Despite the wireline cellular operator's relationships, INPUT found all these firms use an outside RCS.
    - . Separated operations are required under divestiture.
    - . Wireline cellular firms operate as unregulated subsidiaries. Even if allowed, billing systems supported by regulated revenues providing services to unregulated entities are difficult to configure and staffs are often unable to handle the rapid programming changes required by the dynamic tariff changes found in the cellular industry.

- . Also, telco billing systems are not set up to handle cellular's unique requirements. Required modifications cannot be accomplished within the timeframe needed for cellular operations, as discussed in Chapter III, Section E-1.
- Accordingly, as more wireline and non-wireline firms go on-line, the opportunities for RCS vendors increase. However, there are several firms already actively providing services to this segment as profiled in the previous chapter, and further, it will be several years before the cellular processing market will become significant.
- Non-wireline operators have a disadvantage which may affect an RCS which successfully wins business.
  - Wireline operators typically started service first and thus have a marketing lead.
  - The risks of non-wireline failure are significant.
  - An unwary RCS may invest resources in developing a system, hoping for a processing payoff only to find its customer in bankruptcy.
  - The risk is especially true for cellular resellers who operate at narrow margins.
- Widescale acceptance of mobile telephony is only a matter of time. Individuals who prefer the sanctity of their private automobile without the risk of outside interruptions will find reasons to buy cellular telephones when the price is right.
- Mobile data applications using cellular technologies are emerging, but are not expected to have a significant impact on cellular traffic within the forecast period.

- Merchandisers' marketing efforts by Tandy and other major corporations such as Western Union will mean market awareness will not be a problem for the cellular industry.
- RCS vendors seeking involvement in cellular telephone service need to understand the business and its requirements. Clearly, understanding telephone company needs is an advantage, but experience with other forms of mobile communications (Improved Mobile Telephone Service, for example) may be even more advantageous to RCS market position in this telecommunications segment.
- The risks should not be ignored. Failing previous experience, alliances may be appropriate to gain industry knowledge and share risks.

## 2. CATV

- While new services will eventually lead to additional processing needs, INPUT does not see major near-term opportunities in CATV. As new communities become wired, however, the integration of voice and data services, plus future services such as home and business videotex, may extend beyond current corporate users to residences, leading to greater needs for third-party processing.
- For the next five years, new RCS entrants will have difficulty penetrating captured accounts without value added services such as those offered by CableData. Other continuing vendors may need to offer enhanced services to maintain their customer base.

## 3. INTEREXCHANGE CARRIERS

- The major interexchange carriers typically handle their own bill processing needs; however, there are opportunities for RCS services in management

system services and professional services, as described in the previous chapter.

#### 4. LONG DISTANCE RESELLERS

- The reseller segment is largely characterized by entrepreneurial marketing firms, many of which are undercapitalized. Many smaller firms are joining with others to aggregate strengths.
- Resellers cannot use the processing facilities of the firms they are reselling because a mixture of carrier services are used with the actual route for a specific call determined at the time of call. The relatively inexpensive lines being used do not provide call detail recording.
- Most resellers therefore require third-party RCS vendors to handle billing. However, as they become larger through added subscribers or through mergers, resellers may install their own equipment to handle billing and related operations. This represents an opportunity for turnkey systems and professional services firms.
- The risks to RCS vendors are similar to those identified for cellular. Resources may be directed to develop a system, but the customer may enter bankruptcy before substantial revenue is realized from processing services.
- Further, the marketing advantage (if any) of resellers will diminish as equal access is implemented in more areas. This means customers no longer may have to dial a local phone number to access an alternative network and may be more inclined to sign with a major IXC such as MCI or Sprint.
- In these majority of cases, bill processing services are required by resellers, representing a continuing opportunity for RCS firms.

## 5. SHARED TENANT SERVICES

- Shared tenant services have needs similar to those of private corporations, requiring processing services to sort call detail recording data for departmental chargeback and other purposes.
- However, the availability of relatively inexpensive micro-based turnkey systems (starting as low as \$3,500) will reduce those opportunities so that any newly acquired business may be short lived, especially if a cost/benefit analysis of the turnkey system shows an advantage over RCS services.

## 6. ELECTRONIC DATA INTERCHANGE (EDI)

- EDI is the electronic exchange of business information between companies by computer.
- The companies may have different data formats, computers, and communications systems, but EDI software and third-party services work to overcome these differences with protocol/speed conversion and data format translations.
- EDI is typically used for the routine transfer of electronic business documents such as purchase orders and invoices. It is different from electronic mail in that it is process-to-process communications, rather than person-to-person, and the content structure is known in advance, whereas in electronic mail, the content is unknown.
- While transfers directly between companies are possible, the complexities of modern trading relationships are making it necessary to use third-party services, such as those offered by value added networks and their processing affiliates.

- In the electronics industry, and more specifically in the telecommunications industry, EDI services are just getting started. The EDX standard, based on ANSI (American National Standards Institute) X.12 standards that describe transaction sets (the acceptable data formats), is emerging as the specific standard for the electronic industry.
- McDonnell Douglas Electronic Data Interchange Company is providing EDI services to the telecommunications industry on EDI-Net, with Bell Atlantic a major user.
  - Bell Atlantic uses EDI services to communicate with suppliers, principally Western Electric (now AT&T Technologies), using ANSI X.12 standards.
  - EDI-Net is used without translation services. Bell Atlantic handles this on their own processors.
  - Users dial in to deposit purchase orders and invoices in mailboxes.
  - EDI-Net, in this case, connects to AT&T's networks since all trading partners are on that network. EDI-Net acts as a third party to facilitate communications; however, translation and other processing services are available if needed.
- According to INPUT's projections, EDI processing services provided by third-party vendors will grow at an average annual growth rate (AAGR) of approximately 100% through 1990. Accordingly, RCS firms with EDI capabilities should investigate applications in the telecommunications industry.
- More information about EDI can be found in the INPUT report Electronic Data Interchange: Markets and Opportunities, 1985.

- Exhibit V-2 summarizes risks and opportunities for RCS vendors in telecommunications markets.

#### E. OVERALL MARKET ANALYSIS

- Information services expenditures in the telecommunications segment have been massive--over \$1 billion among Bell Companies alone for data processing, systems development, maintenance, and data entry.
- The factors influencing telecommunications are numerous and complex.
  - The introduction of new services, the continuing growth of existing services, plus the characteristic market cycles affecting resellers and IXCs introduce both opportunities and risks to service firms.
  - Cellular radio, a choice of long distance carriers, local VANs, Integrated Services Digital Network (ISDN) developments, and digital termination services will all have an impact on billing and processing requirements.
  - The industry's massive structural changes create other risk and opportunity dynamics.
  - The major risk to continuing RCS firms serving the independent telco market will come from AT&T taking responsibility for its own billing. This will undoubtedly lead to a loss of revenue for these services.
- Vendors currently addressing this market but not considering it to be strategically significant should carefully evaluate their current positions.

EXHIBIT V-2

**TELECOMMUNICATIONS SERVICE  
MARKET RISK AND OPPORTUNITY ANALYSIS**

| MARKET                                    | RISK  | OPPORTUNITY   |
|---|---|---|
| AT&T                                      | Loss of RCS Revenue                           | Professional Services, Planning/<br>Facilities Applications                     |
| BOCs                                      | Long Sales Cycle                              | Professional Services, Planning/<br>Facilities Applications                     |
| Independent Telcos                        | Turnkey Systems,<br>Development Costs         | Billing, Tool Rating, Planning/<br>Facilities Applications,<br>Bundled Services |
| Cellular                                  | Non-Wireline Failure,<br>Rapid Tariff Changes | Billing, Marketing Support/<br>Analysis, Roaming Clearinghouse                  |
| Resellers<br>(Long Distance,<br>Cellular) | Company Failure                               | Billing   |
| CATV                                      | Established RCS Vendors                       | Billing, Marketing Support/<br>Analysis, Future Services                        |
| Shared Tenant Services                    | Embryonic Market                              | Billing, Reports  |

- A number of new entrants, often from within the industry, are very well capitalized. They have, by definition, formidable industry experience.
  - The market impact of these firms over the next five years will be such that "casual" participation may be ineffective.
  - Vendors are advised to evaluate their market commitments and strategic goals and act accordingly.
- The opportunities are substantial, but new industry structures will continue to reshape the market and its competitive dynamics.
  - Divestiture presents new opportunities, but deregulation also provides challenges, many having information processing components.
    - For example, increasing industry and regulatory pressures to align prices with costs will increase the demand for sophisticated billing systems using concepts such as measured services as opposed to flat rates.
    - Price-related changes are generally regulated; this introduces political and bureaucratic uncertainties to the market.
  - The challenge to RCS vendors is to position services against in-house solutions and manage the risks. For example:
    - An RCS may put a substantial effort into service development for a specific client.
    - The reward is in continued processing; however, if the customer fails before the upfront development costs are recovered, the investment may be lost unless the experience can be profitably applied elsewhere.

- Despite these factors, INPUT believes there will be modestly increasing demands for processing services in the industry.
  - Existing predivestitute, prederegulation installed systems are not necessarily situated to the demands of the new environment.
  - Processing is needed not only for repricing existing services, but for new services and applications and for managing the installation of new, large, and complex technologies.

## F. MARKET FORECAST

### I. ASSUMPTIONS AND EXCLUSIONS

- While AT&T's takeover of its own billing will eventually impact RCS firms providing services to independent telcos (who then charge AT&T), those primarily losing business during the forecast period will be the BOCs and larger independents which handle their own processing.
  - AT&T will first seek to reduce the fees it pays the larger companies.
  - This represents captive processing and does not affect the market forecast.
- AT&T's internal processing costs and its payments to the BOCs and GTE for continuing services are also captive and are not included in the forecast; this processing business is not available to RCSs firms. Similarly, BOC and independent telco internal costs are excluded.

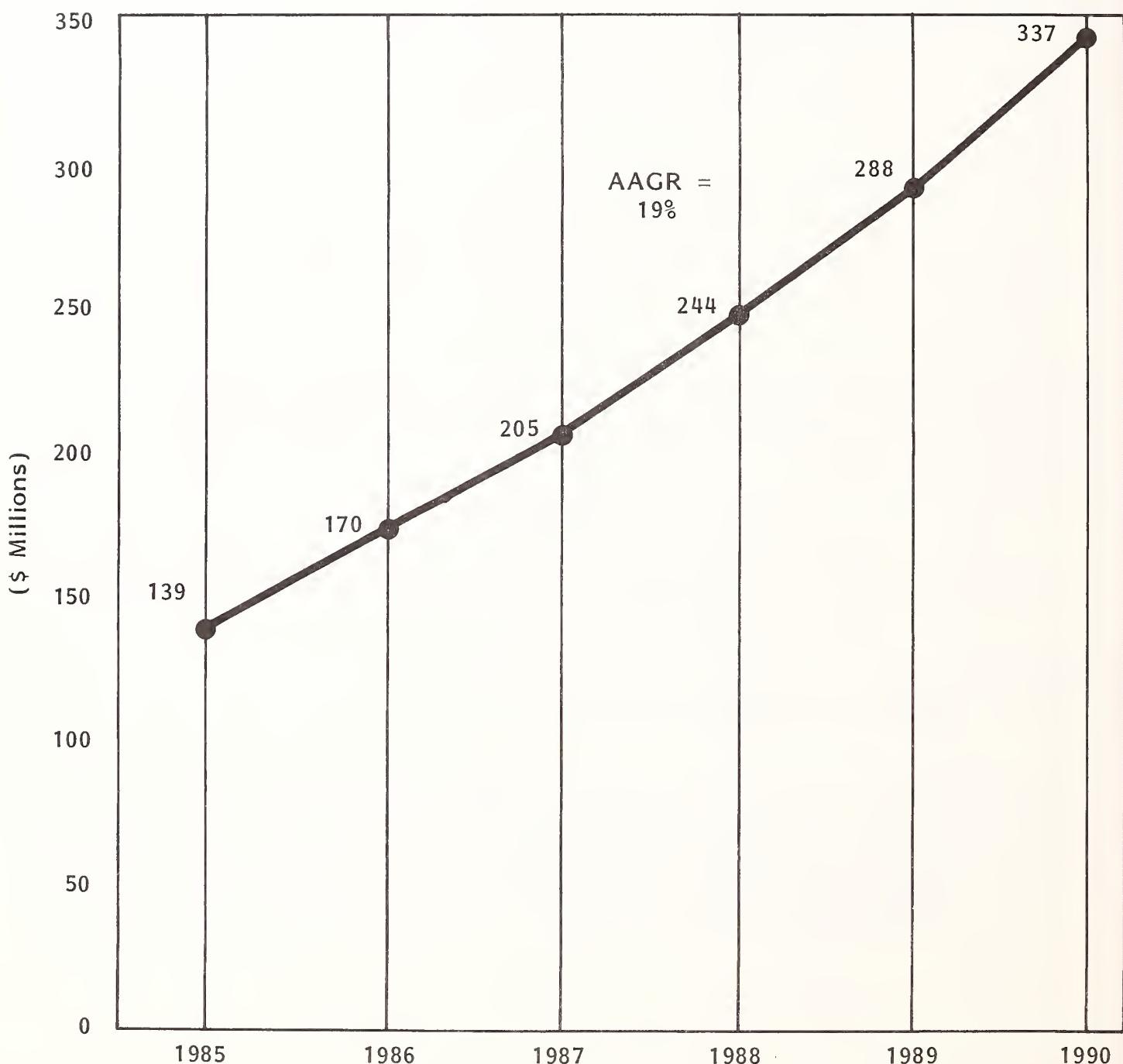
- The forecast covers billing, administrative applications (order control, inventory control, accounting, personnel management), and facilities management/planning. Excluded from the forecast are facilities management services, directory data base management services, CATV, STS, and internal systems used to allocate telephone charges to departmental users.
- Other factors considered in the forecast are:
  - Increasing use of direct dialing for data communications will lead to more network traffic, which in turn leads to more processing volume for firms serving independent telcos.
  - In many areas, access to VAN nodes for credit card authorizations and point of sale applications will require long distance calling, thus increasing local company access charge calculations and call data processing needs.
  - INPUT estimates that the number of telco subscriber access lines is growing at 1.7%-3% annually, with 114.4 million lines operating in 1984.
  - Batch processing, largely represented by billing services, will experience a slow decline due to electronic data transfers in polling applications and the growth of internal systems.

## 2. AGGREGATE MARKET FORECAST

- Exhibit V-3 shows the aggregate market for processing services used by telecommunications entities. As shown, INPUT estimates the current (1985) market at \$139 million with an AAGR of 19%, leading to an aggregate market of \$337 million by 1990.

EXHIBIT V-3

TELECOMMUNICATIONS PROCESSING SERVICES USER EXPENDITURES



### 3. MARKET SEGMENTS

#### a. Batch Processing/Remote Processing Split

- As noted above, billing services will increase. However, as a batch processing mode, there will be erosion, with some of the loss being applied to the remote computing (polling) mode, but other losses due to internal system implementation.
- Exhibit V-4 shows INPUT's segmentation between batch and remote processing in the industry.

#### b. Telephone Management Services

- The two primary RCS telephone management service providers are McDonnell Douglas ISG and Comshare. Exhibit V-5 shows how this segment is currently divided, based on revenues.
- The next chapter provides INPUT's recommendations to RCS firms now involved or planning involvement in providing processing services to telecommunications companies.

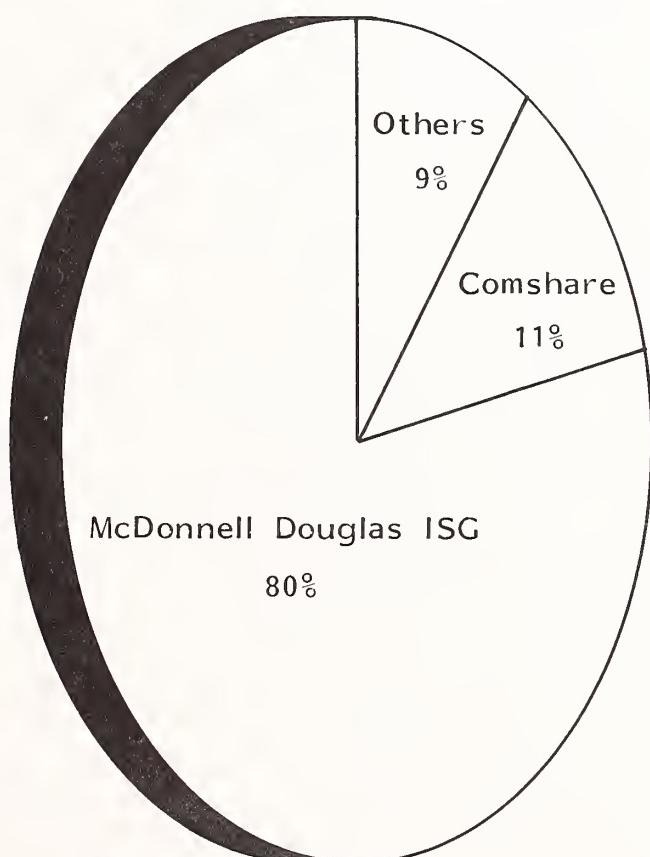
EXHIBIT V-4

BATCH VERSUS REMOTE COMPUTING SERVICES

|                  | 1985     | 1986     | 1987     | 1988     | 1989     | 1990     |
|------------------|----------|----------|----------|----------|----------|----------|
| Aggregate Market | \$139.00 | \$170.00 | \$205.00 | \$244.00 | \$288.00 | \$337.00 |
| Remote           | 116.76   | 146.20   | 181.42   | 221.06   | 265.82   | 316.78   |
| Batch            | 22.24    | 23.80    | 23.58    | 22.94    | 22.18    | 20.22    |

EXHIBIT V-5

RCS TELEPHONE MANAGEMENT SERVICES





## **VI RECOMMENDATIONS AND CONCLUSIONS**



## VI RECOMMENDATIONS AND CONCLUSIONS

### A. GENERAL RECOMMENDATIONS

- For vendors contemplating processing service development in this market, INPUT recommends that:
  - Recognition be made of the extremely long lead times and planning cycles characteristic of telephone operations.
  - Accordingly, vendors need to be prepared for relatively long sales cycles, particularly in still regulated segments.
- By the same token, there may be targets of opportunity created in some segments caused by poor planning.
  - Examples are the cellular telephone reseller industry and shared tenant services where the focus is on marketing or raising funds and not on operational requirements.
  - A flexible RCS may be able to respond quickly, to its advantage.

- Vendors need to be aware that systems are often massively complex.
  - For example, Computer Sciences Corporation's TIRKS service (described in Chapter IV, Section B) was developed over 10 years and contains five million lines of code.
  - Such systems can be interrelated in extremely subtle ways.
  - This fact may heavily influence service or software design, may prove expensive to develop, and may retard market acceptance of what otherwise may be a good idea.
- Vendors need to recognize the operational differences between BOCs, large and small independents, cellular companies, and other telecommunications entities. This can be critical to success. The differences in automation levels between these groups are significant.
- Vendors should evaluate the processing services now offered to local telephone companies to determine the feasibility of acquisitions, especially of larger firms serving specific regional areas or market segments or of processing firms held by operating groups.
- It is particularly important for RCS firms offering billing processing to remain current on tariff changes and industry reporting requirements and to implement systems with the flexibility to handle these changes quickly.
  - The leading reason for a telco's dissatisfaction with its current RCS is an inability to respond to these changes.
  - System flexibility is also important in servicing the cellular segment where rapid pricing changes are common as wireline and non-wireline operators seek a competitive advantage based on price.

- Vendors planning to compete with existing firms offering such services as billing services must add value by including other services as part of a bundled service package or making available "one-stop shopping" for needed services. Examples include:
  - Company advertising inserts in billing statements.
  - Directory assistance and directory processing/printing services.
  - Free employee payroll processing services.
  - Network design, telephone inventory management/order processing services.
  - Payment processing and general business accounting services.
  - Financial services management through a local bank.
  - Marketing support systems such as telemarketing and market analysis services.
- Further, vendors should implement remote polling, electronic data transfer, and distributed processing capabilities to obviate the time and operational problems inherent in using physically transported computer tapes and to capitalize on growing telco computerization.

## **B. INVESTIGATE PROFESSIONAL SERVICES OPPORTUNITIES**

- RCS firms with professional service capabilities should consider providing such services to the telecommunications industry.

- The breakup of AT&T has created a need at the regional operating companies to develop their own data processing and communications systems.
- Systems planned and implemented by RCS may be sacrificed to the movement of larger telco operating groups to in-house processing. In these cases, there may be continuing facility management opportunities.
- Vendors with experience in related industries such as utilities may consider applying their expertise to the telecom industry. A number of utility firms also operate local telephone companies, and one RCS profiled also does processing for utilities.

### C. INVESTIGATE SOFTWARE OPPORTUNITIES

- The microcomputer's capabilities have impacted RCS business. Many firms are now offering micro software, sometimes bundled with hardware into a turnkey system which permits data collection by the client. This data is then transferred to the RCS for processing.
- The fact that many small independent telcos are yet uncomputerized accentuates this opportunity, one which has been recognized by RCS firms involved in the industry as the profiles in Chapter IV reveal.
- There are also opportunities for large-scale mainframe and minicomputer software systems configurable to telco's existing processors and in competition with UNIX-based applications offered by AT&T and Bell Communications Research.

#### D. E-MAIL SERVICE OPPORTUNITIES

- RCS vendors with E-mail services should evaluate options for selling these services through the unregulated BOC subsidiaries and independent telcos. Southern New England Telephone is reselling E-mail services to its business customers.
- INPUT's recommendations are shown in Exhibit VI-I.

#### E. CONCLUSIONS

- In summary, the market for services to the telephone industry has been torn asunder and accelerated by external events which, by definition, are outside the control of the companies themselves or the RCS vendors serving them.
- Acceptable growth levels and large expenditures are expected over the forecast period and probably beyond.
- For those with full understanding of market requirements, the cash flow to support large development efforts, the determination to prevail during long sales cycles, and the willingness to take risks associated with judicial and regulatory events beyond company control, the market for telephone industry services has the potential for substantial rewards.
- For the successful, the rewards will compensate for the risks involved.

## EXHIBIT VI-1

### RECOMMENDATIONS

- Recognize Long Sales Cycles but Stay Flexible
- Recognize Differences Among Subsegments
- Plan for Rapid Industry Reporting/Pricing Changes
- Offer Value Added Services
- Offer Polling, Electronic Data Transfer, and Distributed Processing
- Investigate Professional Services Opportunities
- Apply Utility Experience to Telecom Markets
- Investigate Software Opportunities
- Sell E-Mail through Telcos

## **APPENDIX A: DEFINITIONS**



## APPENDIX A: DEFINITIONS

- AMA - Automatic Message Accounting. Sometimes called CAMA for Centralized Automatic Message Accounting or LAMA for Local Automatic Message Accounting.
- AMASE - Automatic Message Accounting Standard Entry.
- BOC - Bell Operating Company.
- BYPASS - Refers to the use of one of several technologies (such as microwave) to avoid using local telephone company facilities.
- CABS - Carrier Access Billing Service, evolved due to telephone industry deregulation.
- CATV - Originally Community Antenna Television, now refers more broadly to Cable Television, including satellite delivered and local programming in addition to retransmission of off-air signals. May use plant facilities to provide other services such as data and/or voice transmission.
- CDR - Call Detail Recording, a feature present on many private branch exchanges located within a business's premises.
- CELLULAR RADIO OR TELEPHONE - A recently introduced form of mobile telephone service which offers more capacity than previous systems.

- DIVESTITURE - The action, stemming from antitrust lawsuits by the Department of Justice, which led to the breakup of AT&T and its previously owned local operating companies.
- DTMF - Dual Tone Multi Frequency; i.e., "touchtone."
- EQUAL ACCESS - The requirement that the same quality of lines must be offered at the same price to the interexchange carriers as is offered to AT&T for long distance connections. Where local facilities are sufficiently advanced to permit, it also eliminates a subscriber's need to dial special phone numbers to access an interexchange carrier or to use DTMF (Dual Tone Multi-Frequency) touchtone telephones to control calling.
- FLAT RATE SERVICE - A fixed fee charged for a certain number of local telephone calls.
- FUTURE SERVICES - New media and services such as videotex, home banking, and teleshopping.
- INDEPENDENT TELEPHONE COMPANY - A telco unaffiliated with a BOC.
- INFORMATION ACCESS - The required provision of specialized exchange services in connection with telecommunications traffic from or to the facilities of an information services provider, including, among other information, automatic calling number identification and customer billing information.
- ISDN - Integrated Services Digital Network.
- IXC - Interexchange Carrier, a long distance provider. Sometimes called Other Common Carrier (OCC).

- LATA - Local Access Transport Area, where communications are handled by the local telco.
- MEASURED SERVICE - Local telephone service billed on an "as used" basis. Compare to flat rate.
- MFJ - The Modified Final Judgement issued by Judge Harold Greene which described the conditions for AT&T's breakup and its new relationships with the Bell Operating Companies and other telecommunications firms.
- NECA - National Exchange Carriers Association, representing local carriers, that collects and pools fees from telcos which are distributed to members on a formula based on the costs of doing business.
- OCC - Other Common Carrier: a long distance telephone service provider other than AT&T.
- PSTN - Public Switched Telephone Network.
- PUC - Public Utilities Commission. In each state the PUC approves intra-state tariffs.
- RESELLER - A marketing organization which buys long distance capacity for others at wholesale rates, sells services at discounted retail prices, and profits on the difference.
- RBOC - Regional Bell Operating Company, one of seven holding companies coordinating the activities of the BOCs. Also called RHC for Regional Holding Company.
- RCS - Remote Computing Service.

- STS - Shared Tenant Services, a bundling of business and telecommunications services provided to tenants in a building (or on a campus) which is operated by a real estate enterprise or its agents.
- SMDR - Station Message Detail Recording, organized information processed from CDR data.
- TELCO - Telephone Company.
- WATS - Wide Area Telephone Service, also called outbound 800 service. A bulk rate, discounted, long distance service.
- SETTLEMENTS - The division of revenue between local service providers and IXC long distance service providers.
- WIRELINE - Used in referring to the local telephone company as a provider of cellular telephone service.

**APPENDIX B: TELECOMMUNICATIONS COMPANY  
QUESTIONNAIRE**



## APPENDIX B

### TELECOMMUNICATIONS COMPANY QUESTIONNAIRE

My name is \_\_\_\_\_, with INPUT, a management consulting firm based in Mountain View, California. We're writing a report on external processing services used by telecommunications companies. I would like to ask you a few, brief questions --- it should only take about 10 minutes. Is now a good time?

First, let's verify some information.

#### 1. IS YOUR COMPANY A:

- A BELL OPERATING COMPANY  A REGIONAL BELL OPERATING COMPANY  
 A SUBSIDIARY OF A RBOC OR BOC  AN INDEPENDENT TELCO  
 A CELLULAR RADIO OPERATOR  A CELLULAR RADIO RESELLER  
 A LONG DISTANCE COMPANY  A LONG DISTANCE RESELLER  
 OTHER: \_\_\_\_\_

2. Could you tell me the size of your company, in annual revenues?

\$\_\_\_\_\_ or the number of subscribers you have: #\_\_\_\_\_

3. Are you currently using any external processing services for the following functions:

- billing  network management  
 network planning  order processing  
 repair service management  yellow pages  
 subscriber directories  OTHER: \_\_\_\_\_  
 NONE

4. Why or why do you NOT use external processing services for these functions?

5. If you do NOT use external services, could you rate on a scale of

1-5, with 5 being very likely, how likely is it that you may use such a service in the future? 1 2 3 4 5 Why this rating?

6. Does your company offer any processing services to other companies? (IF YES:) What types of services?

7. Are there any special problems with selling or otherwise providing services to a subsidiary company, or a sister subsidiary?

8. Could you tell me which companies you are using for external processing services, and what applications you use?

company service

9. On a scale of 1-5, with 5 being very satisfied, how would you rate your satisfaction with the services being provided by external companies. 1 2 3 4 5 Why that rating?

10. On the same scale of 1-5, with 5 being very likely, how likely is it you might change your use of external processing services to INTERNAL processing within next five years? 1 2 3 4 5  
Why that rating?

11. On the same scale, how likely will move to another processing firm within the next 5 years. 1 2 3 4 5

12. Is there any service you would like to have, which is not available from your current vendor, or others you have evaluated?

13. Does your service provide you with other, more general processing services such as general accounting, or payroll services?

14. In the past, AT&T has used the services of the local telephone companies to process long distance billing, however it will take over this function itself. First,

• Do you provide this type of service to AT&T? Y/N

b. Do you provide this type of service to other Long Distance Companies like MCI? Y/N

c. Since AT&T will largely do its own billing, this may mean a loss of business for the local telephone companies, but it also means you may have capacity to do other processing. Does your company plan to apply this capacity to offer processing services to others in the future? Y/N

IF YES: What types of services can your company offer to others?

IF NO: Why don't you think you would be offering services to others?

15. Some telephone companies offer special services such as call forwarding, conference calling and other features. How does this affect the processing you are now doing, or your needs for external services?

16. There has been discussion about "new services" such as electronic mail, videotex and home banking services offered by, or through local telephone companies. Does your company plan such services? Y/N

a. (IF YES:) Do you think you will do the processing associated with these future services or would another party handle processing?

self                    other company

b. What about Cellular Radio? Do you see any involvement in providing processing services to the non-wireline carriers in your area? Y/N

c. What about the wireline carrier? Y/N

d. How about other mobile telephone services? Or paging companies?

e. Could you discuss why or why not?

That completes the formal portion of the interview. Are there any other perspectives you can provide on the use of outside processing services by companies such as yours?



**APPENDIX C: REMOTE COMPUTING SERVICE  
QUESTIONNAIRE**



## APPENDIX C

### REMOTE COMPUTING SERVICE QUESTIONNAIRE

My name is \_\_\_\_\_, with INPUT, a management consulting firm based in Mountain View, California. We're writing a report on processing services used by telecommunications companies. I would like to ask you a few, brief questions --- it should only take about 10 minutes. In return for your cooperation, we'll send you a reference summary of the report. Is now a good time?

1. What services do you provide.

billing                    mailing services  
 key entry                customer account inquiries  
 general accounting       database(directory) management  
 inventory management    network design applications (on-line)  
 clearinghouse services    toll rating  
 other

2. Is your firm owned by, or affiliated with any other company? IF YES: Could you describe the relationships?

3. How many clients do you have for telephone services? [PROBE FOR RANGE]

4. Would you say your clients are nationwide, regional or local?

5. Do you provide services to any other telecommunications vendors such as cellular or other mobile telephone, paging companies, or cable television? Which ones?

6. If you offer services to firms OTHER than telecommunications, approximately what percentage of your revenues can be traced to telecommunications company services?

7. Our report will size the market for processing services. Could you tell me a) What is your annual revenue: \_\_\_\_\_

or b) your revenues due to telecommunications company services? \_\_\_\_\_

8. How are your services priced?

\_\_\_\_per bill processed    \_\_\_\_by value of bill.

\_\_\_\_fixed fee                \_\_\_\_other:

9. Do you see prices charged for services going up, staying the same, coming down? Why that response?

10. Are your services bundled in any way. In other words, do you offer "packages" of services such as billing and general accounting, to your clients?

11. Why should a local telephone company use your services rather than install their own system?

12. Why should or why does a telephone company owned by a major operating group use your services?

13. [IF YOU PROVIDE SERVICES TO CELLULAR TELEPHONE OPERATORS,] Why does a cellular subsidiary of a major BOC or operating group use your services rather than the processing which may be provided by the BOC or operating group?

14. Have you seen an increase in activity, or a decrease in the services you provide, or is it staying fairly stable. Why? and by what percentage is the change?

15. In the next five years, do you see demands for services such as yours increasing or decreasing?

16. How has the divestiture of AT&T affected your processing business?
17. What are some of the typical problems you need to address due to changes in telecommunications?
18. Who do you see as your major competitors?
19. In your opinion, what are your major competitive strengths?
20. How does the availability of turnkey systems affect your processing businesses?
21. Do you also offer turnkey systems?  
IF YES: a) Do you sell your own turnkey systems, or those of other companies? b) Which ones?
22. a) Do you offer any other services to telecommunications companies, such as consulting, software maintenance or other types of professional services? b) Why or Why Not?
23. What problems, if any, do you have with your customers which prevent you from offering better service?
24. Do you see larger company's coming in and competing with you for service?
25. What impact or opportunities do you see so-called future services such as videotex or home banking having on your business?

That concludes our formal interview. Do you have any comments regarding how processing services are now used, or will be used in the future by telecommunications companies?





